# ANALYSIS OF DEMAND AND INVESTMENT OUTLOOK IN OFFICE MARKET IN JAKARTA - INDONESIA

by

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Master of Science in Real Estate Development

## ABSTRACT

Real estate development is a long and often complicated process especially in the market of a developing country like Indonesia. Despite the latest trend of globalization of real estate, the business is still perceived to be very locally oriented. Understanding the market behavior is part of the early process of setting a good strategy that would become valuable inputs for the next stages in the development process.

Indonesia enjoys high economic growth measured by the growth of the real gross domestic product. As the economy grows, so does 'office' employment and hence the need of office space. Based on data from 1976, econometric model was developed and analyzed. The macroeconomic analysis concluded that space per worker is inelastic to rent from the landlords' perspective, but the opposite for tenants, and most of the tenants whose rents are expiring would like to expand to their target occupancy but only willing to pay a small increment. The vacancy in the market or of the building would be used by tenants as the bargaining power to expand, since rents negatively correlate with vacancy. The analysis suggests that the higher the vacancy rate, the lower the target rent or the equilibrium rent accepted by both landlords and tenants. Rents and vacancy rate, along with the total stock determine the level of new supply to the market.

At the micro level, rents is considered as the overall reflection of the quality of product demanded and agreed to be paid by tenants. The model can be used by tenants to optimize their renting decisions who may rent at GSB area in a medium rise building with parking facility and communication services; or by landlords to respond to the tenant's demand.

The forecasts of the market is based on economic growth forecast and confirmed the consolidation of office market for the next 3 years. The model suggests improvement of the market thereafter. This is consistent with the short cycle activity suggested in the completion model, which in turn suggest that the timing may be right to invest and start the early stage of development to be completed within 3 years, provided that the financing can be secured. Developers may set the strategy using the hedonic model and choose SPR location to build a medium rise building with a reasonable number of parking spaces.

Thesis Supervisor: William C. Wheaton
Title: Professor of Economics.

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First and foremost are my parents, especially my father. If it was not for my father, I may not even think about taking another graduate program. His encouragement and support has been so valuable. I dedicate this thesis to them.

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# CHAPTER 1
# INTRODUCTION

## Statement of the Problem

Only one year ago, an article written in an Indonesian business magazine by a leading commercial brokerage and real estate consulting firm stated that despite the softening of real estate market, the competition among real estate brokers was still increasing and the overall development rate in all real estate product did not seem to be slowing down [1]. The statement indicated that oversupply of office space is very likely to occur in Jakarta. As a matter of fact in the first half of 1992, office space supply reached a record high in the last 15 years [2]. This is confirmed by analysts, developers, and other parties that have interests in the office market. Some opinions are quoted the following:

> "The office market continued to consolidate over the second half of 1992 as new space completion slowed down".
> "Future supply over the next two years is expected to fall to about the level of 1992, again due the difficulties of developers to secure funding" [3].

> "Office rentals will remain the same this year, but rental growth is expected in the first half of 1994" [4].

> "The property market is going through its trough of its mainstream cycle period albeit with some limited bright spot. The sector that bears the brunt of the current soft market conditions is the office market; while the retail, hotel, residential and industrial sectors... are still holding their own....Even though residential market is promising now, there are indications to show that it is heading towards an oversupply situation in the not-too-distant future" [5].

Analysts now are trying to forecast the prospect of investments in office market in Jakarta. A quick glance at annual property reports published by major commercial brokers

indicates that the market is experiencing the downturn in the cycle. The question now is how close can one forecast the turning point of the cycle of the office market? Which approach would make a better prediction? What kind of exogenous factors would contribute to uncertainties in the office market cycles?

**Objectives / Purposes of the Thesis**

Real estate development is a long and often complicated process. Some said that the process is partially setting good planning and strategy, but mostly execution. Nevertheless, understanding the market behavior is very critical even for a highly speculative developer. This thesis is intended as a start to understand the macroeconomic aspects of the market that would become valuable inputs in making investment decisions.

The main focus of this thesis is the office market of Jakarta, particularly the prime office (class A) market. Market performance indicators as well as other factors affecting the demand and supply of office space are analyzed, based on certain economic models that have already been developed, and forecasts would be made based on these findings.

At micro level, rent are also considered as the reflection of the overall character of the product demanded and paid by tenants. The thesis discusses the factors that affect the overall consideration of the rent and the result can be used as a tool to understand and to respond to the tenants' demand.

Furthermore, the thesis will discuss the findings and suggestions that can be made from the forecast analysis for the Jakarta office market. The thesis will also discuss the general direction of investment opportunities in office market in Jakarta: the potentials as well as the hurdles, what has been done and what the prospects would be.

**Thesis Organization and Methodology**

The two chapters following the introduction are the overview of the macro-economic context of the Jakarta office market. These chapters present the roles of Jakarta

as the barometer of Indonesia's economy and Indonesia, and claimed by some analysts, as the late comer of the Newly Industrialized Countries in Southeast Asia. And one measure of this is the real estate development in the region.

The emphasize of the thesis is quantitative analysis that apply statistical regressions to economic models for the Jakarta office market. Endogenous and exogenous factors are identified, organized based on the equation developed for each model, and the regression will be run and analyzed. The bulk of the analysis are presented in Chapters 4 and 5, followed by the forecast analysis in Chapter 6.

Chapter 4 discusses the macroeconomic analysis of market determinants to determine the behavior of the market. While Chapter 5 focuses on the microeconomic aspect. Here, real estate is analyzed as a product that reflect the overall considerations of tenants' demand.

There are, however, some problems with the data from Jakarta. Computerization and automation for data management and coordination are relatively new to institutions performing statistical surveys such as the Central Bureau of Statistics and the Jakarta Statistical Office, who are the two main sources of macroeconomic data. This may be one reason of some incompleteness, inconsistency, or incompatibility of data between these two sources. Whenever possible correction and reconciliation measures will be taken for conflicting data. Otherwise, some reasonable assumptions may have to be taken. The incompleteness of the data may be approached with estimates using ratios, multiples, inter and extrapolations which will be identified accordingly in the references or notes.

Business situation and capital market in Jakarta or Indonesia are far less open than those of the U.S. Property market data are proprietary data that are mainly held by major commercial brokers and it is a common practice to be very selective in disclosing these data mainly to maintain some competitive advantage in the market. Another issue is the fact that there are data that can only be identified as originated from 'private independent sources' for the same proprietary and exclusiveness reasons. The data used in the analysis,

however, are the aggregate data, compiled or computed from these sources, which the writer thinks should comply with the validity as well as the necessary confidentiality of the sources.

The relatively short period of the available data has made it difficult to do time-series analysis that normally require at least 20 years of data. But it is still worth doing as the results of analyses are discussed in the conclusion sections in each chapter and summarized in Chapter 7. Chapter 7 closes the thesis with the discussion on what had been learned and what kind of prospect of investment in the office market in Jakarta.

**References**


[1] Agung Firmansyah and Robinson P., "Degup dibalik Keluh", *Prospek, Weekly Economic News* (March 21, 1992), p. 32; *(in Indonesian).*

[2] "Property Market Outlook", *Procon Indah / JLW Research,* January 1993, p.1

[3] See [2], p.2

[4] "Office Rentals Will be the Same This Year. The Colliers Jardine Update," *Property Link, Real Estate News in the Asia Pacific Region,* (February 1993) p.45

[5] Handy Lim, "Property Market Has Its Bright Spots", *Property Link, Real Estate News in the Asia Pacific Region,* (February 1993) p.46.

# CHAPTER 2
# ECONOMIC PROFILE OF JAKARTA

## Jakarta and the Indonesian Economy

As the capital of Indonesia, Jakarta becomes the center and the barometer of political, economic, social, and cultural activities. The city development outgrows any other major cities in Indonesia. From the long history of the city, even before it became the capital and called Jakarta, the city had always shown its significant and important roles in the development of the country as a whole. The growth of the national economy also reflects the economic growth of Jakarta.

Indonesia is now in its Fifth Development Plan. The Plan was started in 1969 as the government efforts to improve the economy, promote exports, and reduce the country's debts. The targets of the Plan were first the basic industry of agriculture and development of infrastructure and gradually expanded until now Indonesia has one of the fastest growing manufacturing in Asia . In most of the Plan, Indonesia rely on its oil production and exports, and foreign capitals to support the expenditures and investments. In fact, until the mid eighties, oil and petroleum products became the backbone of Indonesian economy, account for 80% of total export value [1]. The Plans, despite several disruptions of oil crises that force the government to defer some of the projects, has enjoyed high economic growth. Table 2.1 exhibits selected Indonesian economic indicators.

The growth rate of real GDP is down compare to previous years, but there are non-oil export gains that would help Indonesia to gradually decrease its dependency to oil exports. Part of this gains are stimulated by deregulatory measures taken by the government in late 1987 that increase activities in the capital market, especially in the

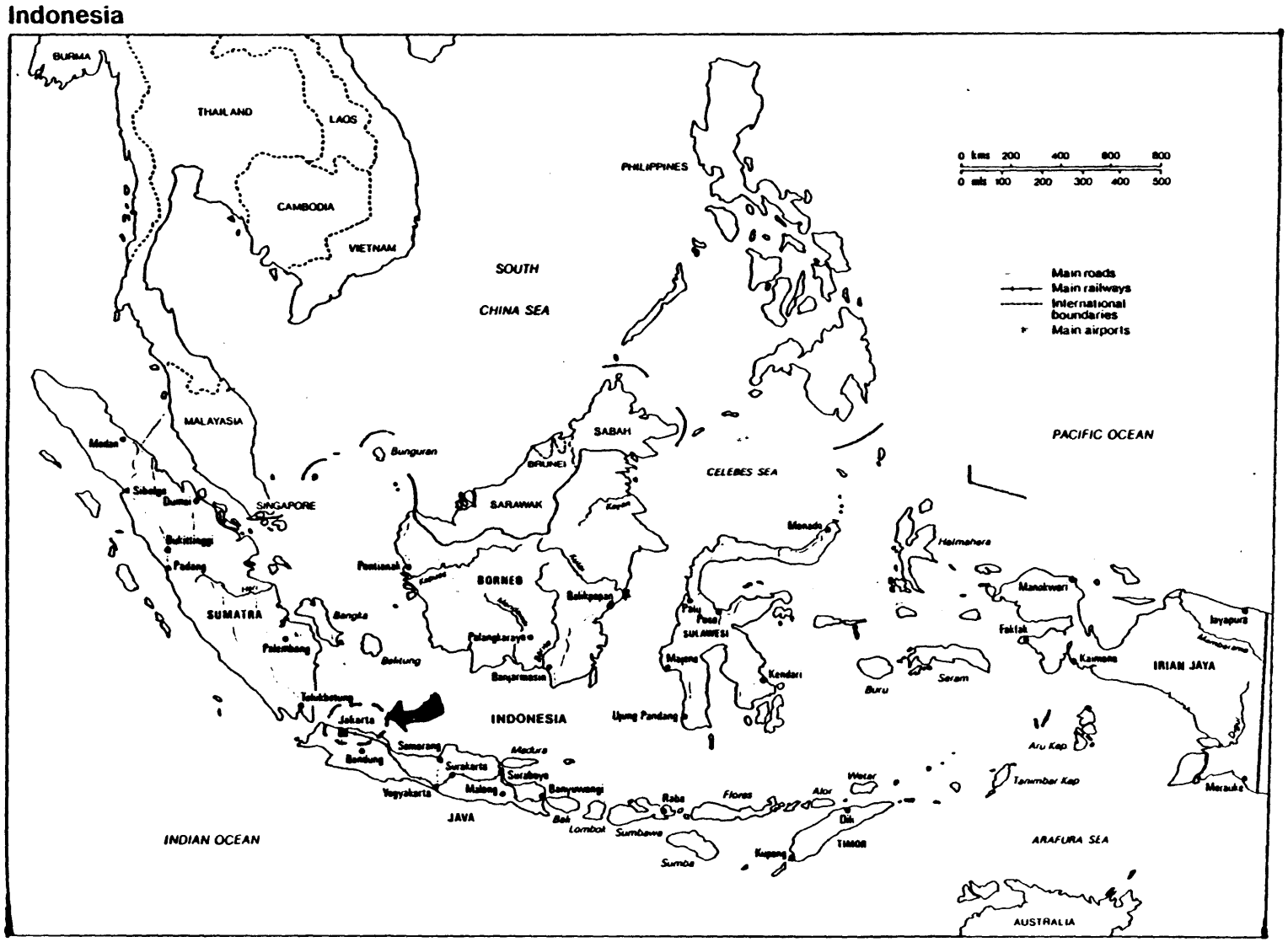


Figure 2.1 Map of Indonesia

Table 2.1 Selected Indonesian Economic Indicators

| YEAR | REAL GDP at'85 PRICE (billion Rp) [1] | REAL GDP at'85 PRICE (billion US$) [2] | EXPORT INCL. OIL (million US$) [3] | DOMESTIC INVESTMT (million Rp) [4] | FOREIGN INVESTMT (000 US$) [5] | TOTAL INVESTMT (million Rp) [6] | TOTAL INV AT '85 PRICE (million US$) [7] | TOTAL No. OF PROJECT [8] | CPI 85=100 [9] | EXCH RATE Rp/US$ 1 [10] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1976 | 56,204.0 | 49.96 | 8,547.0 | 67,128.0 | 103,818.0 | 43,151,598 | 355.99 | 90 | 38.2 | 415 |
| 1977 | 61,128.0 | 54.34 | 10,853.0 | 63,282.0 | 51,380.0 | 21,385,982 | 241.81 | 41 | 42.4 | 415 |
| 1978 | 65,921.0 | 58.60 | 11,643.0 | 70,663.0 | 99,156.0 | 62,043,163 | 341.69 | 48 | 45.9 | 625 |
| 1979 | 70,045.0 | 62.26 | 15,591.0 | 63,912.0 | 143,521.0 | 90,051,579 | 299.21 | 42 | 53.5 | 627 |
| 1980 | 76,965.0 | 68.41 | 21,909.0 | 96,201.0 | 91,609.0 | 57,516,722 | 231.26 | 33 | 62.9 | 627 |
| 1981 | 83,006.0 | 73.78 | 22,260.0 | 277,510.0 | 224,251.0 | 144,695,154 | 535.57 | 32 | 70.6 | 644 |
| 1982 | 84,932.0 | 75.50 | 22,293.0 | 267,762.0 | 951,744.0 | 659,350,482 | 1,119.99 | 49 | 77.3 | 693 |
| 1983 | 88,493.0 | 78.66 | 21,152.0 | 978,703.0 | 791,856.0 | 788,083,567 | 1,789.41 | 86 | 86.4 | 994 |
| 1984 | 94,666.0 | 84.15 | 21,902.0 | 653,001.0 | 305,409.0 | 328,662,267 | 918.39 | 46 | 95.5 | 1,074 |
| 1985 | 96,997.0 | 86.22 | 18,586.7 | 767,281.0 | 247,408.0 | 279,101,281 | 929.44 | 61 | 100 | 1,125 |
| 1986 | 102,696.0 | 91.29 | 14,305.0 | 535,684.0 | 283,786.0 | 466,228,510 | 890.23 | 77 | 105.9 | 1,641 |
| 1987 | 113,455.0 | 100.85 | 17,081.8 | 1,080,263.0 | 501,291.0 | 828,210,413 | 1,541.12 | 89 | 115.6 | 1,650 |
| 1988 | 113,982.0 | 101.32 | 19,224.9 | 1,130,197.0 | 390,758.0 | 677,532,295 | 1,288.06 | 136 | 124.9 | 1,731 |
| 1989 | 122,581.0 | 108.96 | 22,140.2 | 1,736,324.0 | 557,307.0 | 1,003,217,003 | 1,781.03 | 161 | 133 | 1,797 |
| 1990 | 131,614.0 | 116.99 | 25,675.2 | 2,113,451.0 | 1,250,799.0 | 2,379,882,350 | 2,657.43 | 206 | 142.9 | 1,901 |

Sources International Monetary Fund : [1] - [3], [9], [10]

stock market with the permission for foreign investors to purchase Indonesian stocks and the establishment of the OTC. Further deregulation in capital market in 1988 opened up even more opportunities for business expansion in the Indonesian capital market shown by significant increases in the number of banks and stock exchange activities [2].

In this Fifth Development Plan, Indonesia has set a target to obtain offshore capital as the source of government financing to account for roughly 60% of the development expenditure[3]. But the fact is that since the first half of 1992 foreign investment has dropped. Investors continue to put their money to other Asian countries, mainly the People's Republic of China. Indonesia even has to compete with countries like Vietnam for the more scarce offshore capital [4].

The level of domestic investments has dropped recently. The sources of domestic financing have also become more difficult to obtain. Creditors such as banks has implemented tight money policy that translate into high lending rates. Some lenders may charge up to 25% [5]. Foreign financing in real estate is still under tight regulations, especially concerning ownership or control of properties on Indonesian land.

## Economic Indicators of Jakarta.

The economy of Jakarta follow that of Indonesia almost proportionally. The gross domestic products of Jakarta, for example, account consistently for 10 % of the national gross domestic products, as shown in Tables 2.2 c and Figure 2.2. The largest portion of this gross regional products came from trading (25%). The financial sector in Jakarta, although less than trading, accounted for about half of the national gross domestic products coming from the this sector.

The capital market and the flow of foreign investments are basically controlled through Jakarta. The central government policy would almost directly affect Jakarta's economy. The significant number of banks emerged in the mid 80s was the direct results of government deregulation in capital market. The increase activities in the capital market

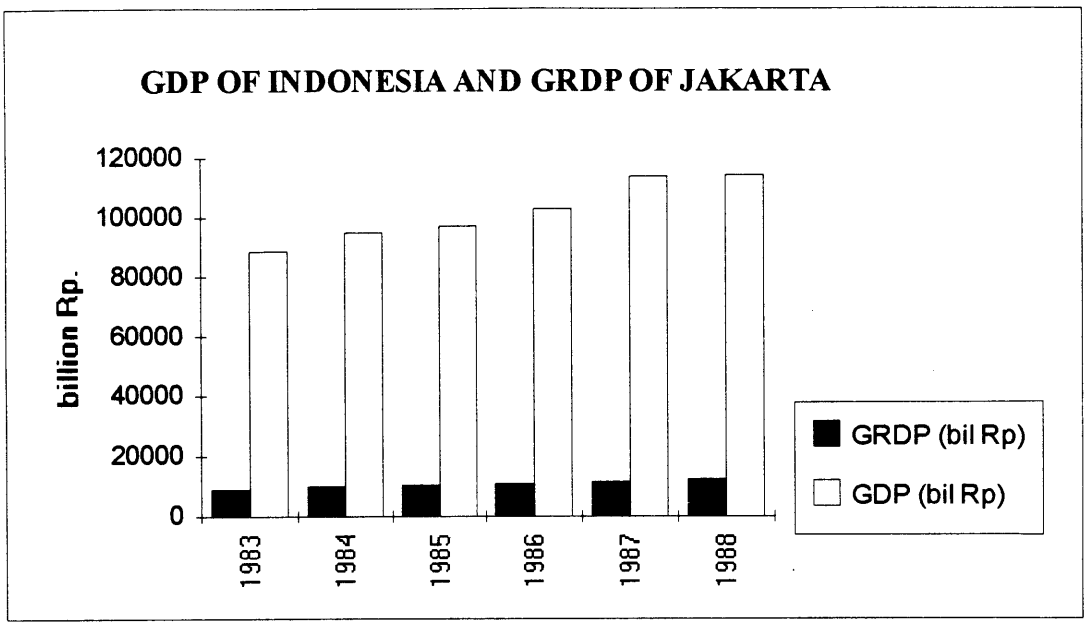


Figure 2.2 GDP of Indonesia and GRDP of Jakarta
Source: Jakarta Statistical Office and Central Bureau of Statistics..

increased the competition among banks during that period, which in turn stimulated the Jakarta economy. The real estate 'boom' in the 80s was part of the effects of this policy to the Jakarta economy.

## Demography and Employment

Indonesia is now the fourth most populated country. It used to be the fifth before the dissolution of USSR. The population based on 1990 census is just under 180 million. Of this population, about 60% live in the island of Java, which is only about 7% of the whole land area of Indonesia. In 1990, over 8 million people live in Jakarta. With the growth rate of 2.38% per year, it is the fourth highest among the ten main cities in Indonesia. The second largest city, also in Java, is at a distant second in term of total number of population.

Table 2.2 Jakarta Economic Indicators

**a. GROSS REGIONAL DOMESTIC PRODUCT OF JAKARTA AT CONSTANT 1985 MARKET PRICE (million Rp)**

| INDUSTRY | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 |
|---|---|---|---|---|---|---|
| Agriculture | 138,327.16 | 134,554.44 | 142,607.76 | 143,496.99 | 159,487.82 | 163,340.11 |
| Manufacturing | 1,523,193.76 | 1,600,883.89 | 1,915,719.03 | 2,068,615.16 | 2,217,996.45 | 2,644,563.65 |
| Utilities | 307,731.24 | 299,225.43 | 398,052.28 | 416,730.63 | 422,036.24 | 530,224.96 |
| Construction | 786,404.00 | 817,231.03 | 849,237.64 | 882,132.24 | 916,082.05 | 1,006,046.61 |
| Trading | 2,255,901.16 | 2,273,679.90 | 2,394,458.60 | 2,437,007.36 | 2,544,931.02 | 2,772,758.97 |
| TSC | 1,051,407.72 | 1,110,261.95 | 1,045,135.13 | 1,110,761.52 | 1,280,769.59 | 1,356,000.21 |
| FIRES | 1,273,920.94 | 2,002,923.68 | 1,821,857.95 | 1,931,067.11 | 1,957,186.01 | 1,858,349.24 |
| Services | 1,043,073.83 | 1,073,633.52 | 1,136,341.64 | 1,183,686.19 | 1,284,816.83 | 1,381,400.78 |
| Public Adm | 533,415.46 | 546,983.03 | 571,415.93 | 593,712.75 | 610,862.54 | 619,124.84 |
| TOTAL | 8,913,375.26 | 9,859,376.86 | 10,274,825.98 | 10,767,209.95 | 11,394,168.54 | 12,331,809.35 |

**b. PERCENTAGE OF DISTRIBUTION OF GROSS REGIONAL DOMESTIC PRODUCT OF JAKARTA**

| INDUSTRY | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 |
|---|---|---|---|---|---|---|
| Agriculture | 1.6% | 1.4% | 1.4% | 1.3% | 1.4% | 1.3% |
| Manufacturing | 17.1% | 16.2% | 18.6% | 19.2% | 19.5% | 21.4% |
| Utilities | 3.5% | 3.0% | 3.9% | 3.9% | 3.7% | 4.3% |
| Construction | 8.8% | 8.3% | 8.3% | 8.2% | 8.0% | 8.2% |
| Trading | 25.3% | 23.1% | 23.3% | 22.6% | 22.3% | 22.5% |
| TSC | 11.8% | 11.3% | 10.2% | 10.3% | 11.2% | 11.0% |
| FIRES | 14.3% | 20.3% | 17.7% | 17.9% | 17.2% | 15.1% |
| Services | 11.7% | 10.9% | 11.1% | 11.0% | 11.3% | 11.2% |
| Public Adm | 6.0% | 5.5% | 5.6% | 5.5% | 5.4% | 5.0% |
| TOTAL (%) | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| TOTAL (mil Rp) | 8,913,375.26 | 9,859,376.86 | 10,274,825.98 | 10,767,209.95 | 11,394,168.54 | 12,331,809.35 |

**c GRDP OF JAKARTA AS A PERCENTAGE OF NATIONAL GDP AT CONTSTANT 1985 PRICE (billion Rp)**

| | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 |
|---|---|---|---|---|---|---|
| GRDP | 8,913.38 | 9,859.38 | 10,274.83 | 10,767.21 | 11,394.17 | 12,331.81 |
| GDP | 88,493.00 | 94,666.00 | 96,997.00 | 102,696.00 | 113,455.00 | 113,982.00 |
| % OF GDP | 10.1% | 10.4% | 10.6% | 10.5% | 10.0% | 10.8% |

SOURCE: Computed From Jakarta Statistical Office and International Monetary Fund

Table 2.3 Jakarta Economic Indicators

**a. GROSS DOMESTIC PRODUCT AT CONSTANT 1985 PRICE**

| INDUSTRY | 1985 | 1986 | 1987 | 1988 |
|---|---|---|---|---|
| Agriculture | 23,250.18 | 24,287.60 | 26,593.85 | 24,016.01 |
| Mining | 16,925.98 | 18,033.42 | 18,527.20 | 18,214.32 |
| Manufacturing | 12,929.70 | 13,781.80 | 15,849.66 | 20,972.69 |
| Utilities | 717.78 | 801.03 | 941.68 | 626.90 |
| Construction | 5,460.93 | 5,679.09 | 6,308.10 | 5,847.28 |
| Trading | 15,083.03 | 16,020.58 | 18,107.42 | 17,906.57 |
| TSC | 5,422.13 | 5,709.90 | 6,376.17 | 5,972.66 |
| FIRES | 2,939.01 | 3,163.04 | 3,517.11 | 4,114.75 |
| Services | 6,450.30 | 6,757.40 | 7,556.10 | 7,237.86 |
| Public Adm | 7,817.96 | 8,462.15 | 9,677.71 | 9,072.97 |
| TOTAL | 96,997.00 | 102,696.00 | 113,455.00 | 113,982.00 |

**b. PERCENTAGE OF DISTRIBUTION OF NATIONAL GROSS DOMESTIC PRODUCT AT CONSTANT 1985 PRICE**

| INDUSTRY | 1985 | 1986 | 1987 | 1988 |
|---|---|---|---|---|
| Agriculture | 24.0% | 23.7% | 23.4% | 21.1% |
| Mining | 17.5% | 17.6% | 16.3% | 16.0% |
| Manufacturing | 13.3% | 13.4% | 14.0% | 18.4% |
| Utilities | 0.7% | 0.8% | 0.8% | 0.6% |
| Construction | 5.6% | 5.5% | 5.6% | 5.1% |
| Trading | 15.6% | 15.6% | 16.0% | 15.7% |
| TSC | 5.6% | 5.6% | 5.6% | 5.2% |
| FIRES | 3.0% | 3.1% | 3.1% | 3.6% |
| Services | 6.7% | 6.6% | 6.7% | 6.4% |
| Public Adm | 8.1% | 8.2% | 8.5% | 8.0% |
| TOTAL (%) | 100.0% | 100.0% | 100.0% | 100.0% |

**c. SECTORAL GRDP AS PERCENTAGEs OF SECTORAL GDP**

| INDUSTRY | 1985 | 1986 | 1987 | 1988 |
|---|---|---|---|---|
| Agriculture | 0.6% | 0.6% | 0.5% | 0.6% |
| Mining | | | | |
| Manufacturing | 11.8% | 11.6% | 12.1% | 9.9% |
| Utilities | 42.9% | 37.4% | 42.3% | 66.5% |
| Construction | 14.4% | 14.4% | 13.5% | 15.1% |
| Trading | 15.0% | 14.2% | 13.2% | 13.6% |
| TSC | 19.4% | 19.4% | 16.4% | 18.6% |
| FIRES | 43.3% | 63.3% | 51.8% | 46.9% |
| Services | 16.2% | 15.9% | 15.0% | 16.4% |
| Public Adm | 6.8% | 6.5% | 5.9% | 6.5% |

SOURCE: Computed from Jakarta Statistical Office and International Monetary Fund

Table 2.4

**Ten Main Urban Centers in Indonesia**

| | Population (000) | | Growth rate |
|---|---|---|---|
| | 1980 | 1990 | |
| 1 Jakarta | 6,504 | 8,228 | 2.38 |
| 2 Surabaya | 2,028 | 2,484 | 2.05 |
| 3 Bandung | 1,463 | 2,058 | 3.47 |
| 4 Medan | 1,379 | 1,730 | 2.29 |
| 5 Semarang | 1,027 | 1,251 | 1.99 |
| 6 Palembang | 787 | 1,144 | 3.81 |
| 7 Ujung Pandang | 709 | 945 | 2.91 |
| 8 Malang | | 696 | |
| 9 Lampung | | 637 | |
| 10 Padang | | 631 | |

Source: The Economist Intelligence Unit, Indonesia Country Profile

In this Fifth Development Plan which began in April 1989, the main concern is to generate adequate employment opportunities for a projected increase in the labor force by almost 12 million new job seekers [6]. Jakarta alone has about 3 million of employed population at working age since 1990.

According to the Indonesia Central Bureau of Statistics, employment is measured as the number of people over the age of 10, which is considered as the starting working age in Indonesia, who are employed. The data on employment in Jakarta are recorded by the Central Bureau of Statistics as part of provincial employment data and the Jakarta Statistical Office. Indonesia is considered as a special district that has the same level of government as provinces.

Table 2.3 shows that agriculture is still the main industry of Indonesia. By contrast it accounts only about 1% of Jakarta employment which indicates the diminishing of agricultural land around the city and the concentration of administrative works in agriculture as well as in other sectors involving natural resources.

Table 2.5 EMPLOYMENT IN JAKARTA, BY MAIN INDUSTRIAL SECTOR

| | 1976 | 1977 * | 1978* | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|
| Agriculture | 39,670 | 36,622 | 54,083 | 28,370 | 31,057 | 31,573 | 27,725 | 25,150 | 31,520 |
| Mining | 9,127 | 10,277 | 8,279 | 14,882 | 16,291 | 16,562 | 16,219 | 16,840 | 20,787 |
| Manufacturing | 186,904 | 201,662 | 189,319 | 265,078 | 290,184 | 295,008 | 297,394 | 318,422 | 310,682 |
| Utilities | 10,194 | 10,515 | 11,414 | 12,275 | 13,438 | 13,661 | 12,121 | 11,154 | 9,038 |
| Construction | 106,452 | 107,416 | 124,563 | 117,395 | 128,514 | 130,651 | 129,414 | 136,029 | 140,541 |
| Trading | 381,201 | 386,279 | 442,400 | 427,723 | 468,234 | 476,018 | 537,729 | 639,687 | 650,286 |
| TSC | 147,734 | 144,954 | 182,131 | 144,336 | 158,006 | 160,633 | 145,930 | 138,566 | 167,484 |
| FIRES | 47,440 | 49,104 | 52,734 | 57,889 | 63,372 | 64,426 | 57,753 | 53,887 | 65,133 |
| Public Services | 573,794 | 588,717 | 649,541 | 676,672 | 740,761 | 753,076 | 773,664 | 844,387 | 860,195 |
| Others | 31,070 | 28,062 | 43,755 | 19,418 | 21,257 | 21,610 | 12,371 | 2,843 | 3,841 |
| **TOTAL** | 1,533,586 | 1,563,608 | 1,758,218 | 1,764,038 | 1,931,114 | 1,963,218 | 2,010,321 | 2,186,965 | 2,259,508 |

EMPLOYMENT IN JAKARTA, BY MAIN INDUSTRIAL SECTOR (continued)

| | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992** |
|---|---|---|---|---|---|---|---|---|
| Agriculture | 37,207 | 47,948 | 34,176 | 46,726 | 28,441 | 31,634 | 30,065 | 44,500 |
| Mining | 24,276 | 11,905 | 10,505 | 10,413 | 9,698 | 7,786 | 13,250 | 12,748 |
| Manufacturing | 293,576 | 465,591 | 499,885 | 486,944 | 495,148 | 602,900 | 630,823 | 630,248 |
| Utilities | 6,579 | 30,501 | 26,915 | 26,679 | 23,913 | 27,253 | 27,004 | 32,584 |
| Construction | 141,116 | 112,917 | 127,281 | 134,108 | 126,696 | 146,477 | 172,220 | 162,153 |
| Trading | 642,282 | 613,401 | 688,974 | 696,343 | 796,356 | 871,499 | 883,045 | 899,974 |
| TSC | 192,589 | 243,711 | 215,054 | 213,173 | 177,759 | 212,636 | 238,951 | 260,754 |
| FIRES | 74,896 | 92,822 | 104,630 | 110,242 | 109,227 | 123,598 | 132,482 | 133,323 |
| Public Services | 851,461 | 681,749 | 768,478 | 809,694 | 842,234 | 912,334 | 922,783 | 979,423 |
| Others | 4,764 | 1,982 | 1,749 | 1,734 | 1,940 | 2,432 | 509 | 2,099 |
| **TOTAL** | 2,268,747 | 2,302,527 | 2,477,648 | 2,536,056 | 2,611,412 | 2,938,549 | 3,051,133 | 3,157,806 |

Sources: Derived from Central Bureau of Statistics
Jakarta Statistical Office

**NOTES**

* Estimates

** Projection

Agriculture : includes forestry, hunting, and fishery

Utilities : includes electricity, gas, and water

Trading : includes wholesale, retail, restaurants, and hotels

TSC : Transportation, Storage, and Communication

FIRES : Finance, Insurance, Real Estate, and certain business Services
Business services include legal, accounting, architectural and engineering, advertising, information, and marketing consultants

Public Services : include health and medical, education, entertainment, social, government, and other services

Public services in Jakarta, which include most of the employees government agencies (sometimes referred as 'civil servants' in statistical reports) accounts for almost one-third of total employment each year for the past 6 years.


Figure 2.3 Indonesia's GDP and Employment Level in Jakarta
Sources: Central Bureau of Statistics, Jakarta Statistical Office, International Monetary Fund

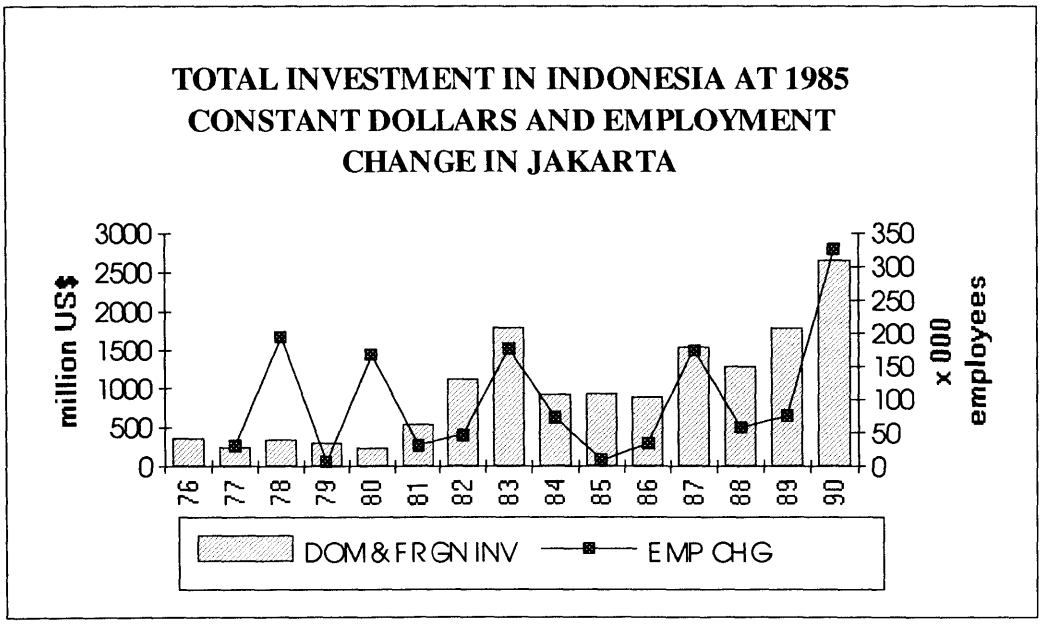


Figure 2.4 Total Investment in Indonesia at 1985 Contant dollars and Employment Change in Jakarta.
Sources: Central Bureau of Statistics, Jakarta Statistical Office, International Monetary Fund

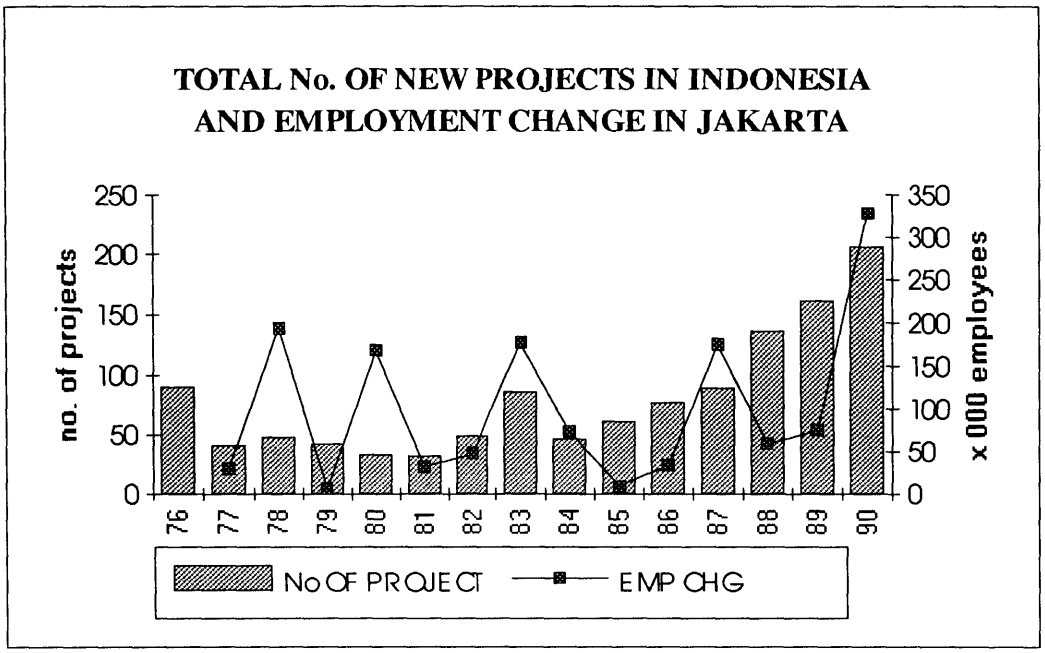


Figure 2.5 Total Number of New Projects in Indonesia and Change of Employment in Jakarta.

Sources: Central Bureau of Statistics, Jakarta Statistical Office, International Monetary Fund


Figure 2.6 Employment Growth of Jakarta, Real GDP Growth and Export of Indonesia.

Sources: Central Bureau of Statistics, Jakarta Statistical Office, International Monetary Fund

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[6] See [3], p.15

# CHAPTER 3
# THE JAKARTA OFFICE MARKET

## Real Estate / Property Market in Jakarta

The real estate industry in Jakarta is commonly referred as property business. Development of the prototype of commercial areas started as early as the middle of 17th century in the coastal areas of Jakarta which was known then under the Dutch name of Batavia. The commercial and residential then developed along the river of Ciliwung south of the coastal area. This area, now called Hayam Wuruk / Gajah Mada (referred later as GHK) still become one of the prime office locations in Jakarta.

The development of a satellite city of Kebayoran Baru, at the south of Jakarta, was planned in 1949. When the plan was implemented shortly after, office buildings were built along the artery road connecting the two centers. A major hotel was built in 1962 and considered as the beginning of the era of modern multi-story buildings in Jakarta. But it was not until the first 32 story high rise office building was built across the hotel by a joint venture of the government of Indonesia, Japan Air Line and Mitsui, a major real estate developer in Japan, that the development of real estate in Indonesia was in its full gear to take off.

The main artery, known as Jalan (or road) M. Husni Thamrin (MHT) and Jalan Jenderal Sudirman (SDM) were then established as the primary financial district or central business district of Jakarta. The development of the area along Jalan (or Road) Jenderal Gatot Subroto (GSB) and Jalan HR Rasuna Said (HRS) transformed the area into what is now known as the 'Golden Triangle' of Jakarta [1]. The completion of toll expressway at the inner ring road of Jakarta, passing the GSB area has prepared the triangle for further development. The price of land around the area is soaring high. With the skyrocketing

price of land in this Golden Triangle, development now also expands to the outer perimeter of this area (fringe area). The development along the inner ring road to the west direction started to connect the 'old' CBD (GHK location) with the Golden Triangle, while to the east, the road will lead to the industrial estate area.

Soon residential areas are pushed to the suburban which creates the problems of traffic for commuters. Along with the development of residential areas, shopping centers have been developed. The development of shopping centers basically follows the pattern of residential development. The latest trend in residential development in Jakarta, especially those developed by major developers are to build an 'integrated small town' complete with shopping facilities, social facilities such as schools, religious buildings and sport centers, and sometimes even health care centers. These shopping centers may then turn out to be large enough to serve a larger service area [2].

Another 'new' phenomenon is the development of multi-story apartments. The target market of this is usually the expatriates working for foreign or multi national firms. Therefore, the preferred locations are to be minutes away from the main CBD, which in turn results in the high rent rates. Some commercial broker reports indicates that at this time this is the type of real estate product that stays relatively stable in terms of returns on investment [3].

In the industrial sector, industrial real estate is considered to be highly regulated mainly concerning the ownership and the large capital required for development and also concerning environmental issues. The east of Jakarta has been developed into the largest urban industrial estate in the country.

Other than Jakarta, Surabaya the provincial capital of East Java is considered as second in real estate development. Although still distant, the gap of the development levels between the two cities seems to be narrowing. Bandung, Medan, and Semarang,

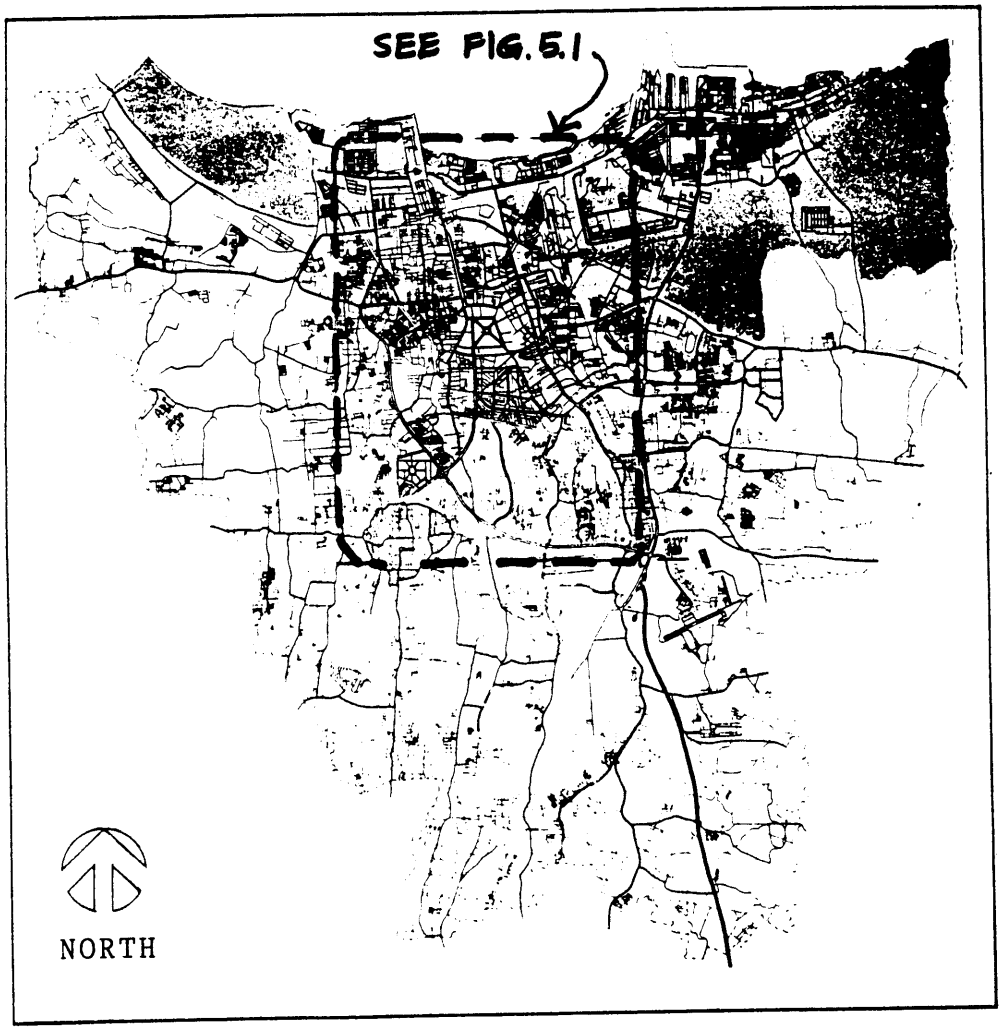


Figure 3.1 Map of Jakarta

the provincial capitals of West Java, North Sumatra, and Central Java, respectively, also experience significant increase in real estate development activities compare to previous years [4].

In general, Jakarta can be considered as the indicator of real estate development in Indonesia. Recent reports of Asian Property Market Survey by Brooke Hillier Parker shows that despite the downturn of real estate business, the percentage of yields of investment, especially in retail and residential are among the highest compared to other Asia Pacific countries. The office market performance, however, is at relatively mediocre levels, both in the percentage of investment yields and market rental values [5].

## Indicators of the Jakarta Office Market

In the Jakarta office market, the total stock of prime commercial office had grown from about 200,000 square meters in 1978 to 1,900,000 square meters in 1992, or more than nine times within 15 years, as shown in Figure 3.3. The highest level of new office supply occurred when the office market experienced boom periods in 1985 and 1991, as shown in Figure 3.2. The high development activities during these periods reflected the response of developers to the economy growth of Indonesia, measured by the growth rate of the national gross domestic product.

Although the peaks of the economic growth are higher in 1980 and 1987 as shown in Figure 2.6, development activities did not occur immediately after these two periods. Figure 2.6 shows very sharp declines in economic growth after the two peaks. Oil crisis in 1982 certainly prevented developers to immediately start development after the 1980 high economic growth, so did the very growth rate in 1988. But the reactions to the next peaks following these two economic downturns were quite prompt resulting in the two boom periods in the anticipation of better economy.

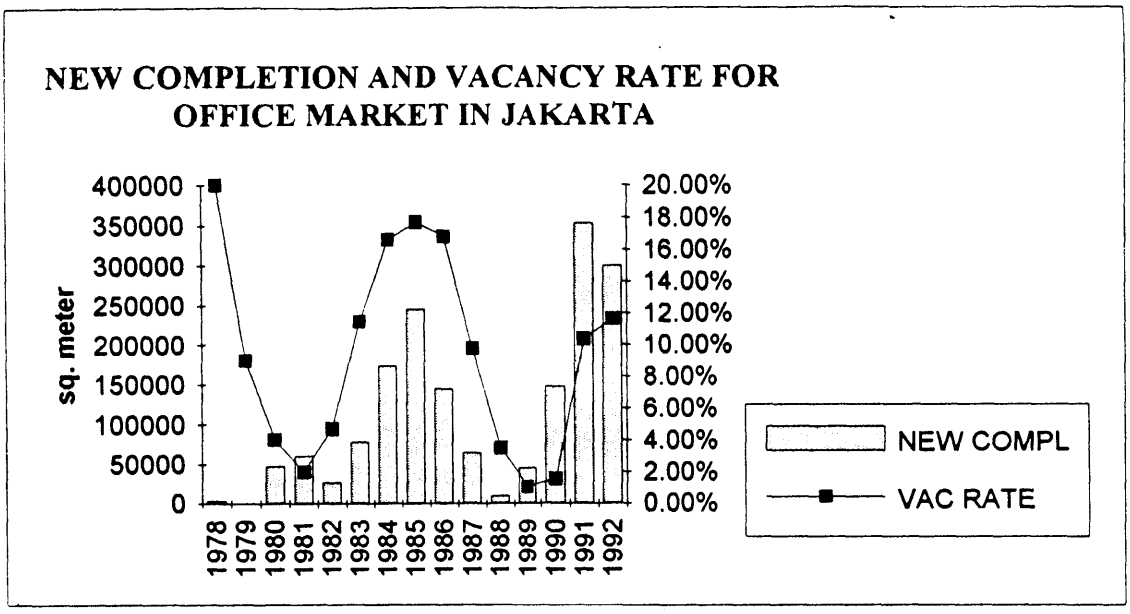


Figure 3.2 Historical New Completion and Vacancy Rate for Office Market in Jakarta

Source Procon Indah/Jones Lang Wootton, Colliers Jardine

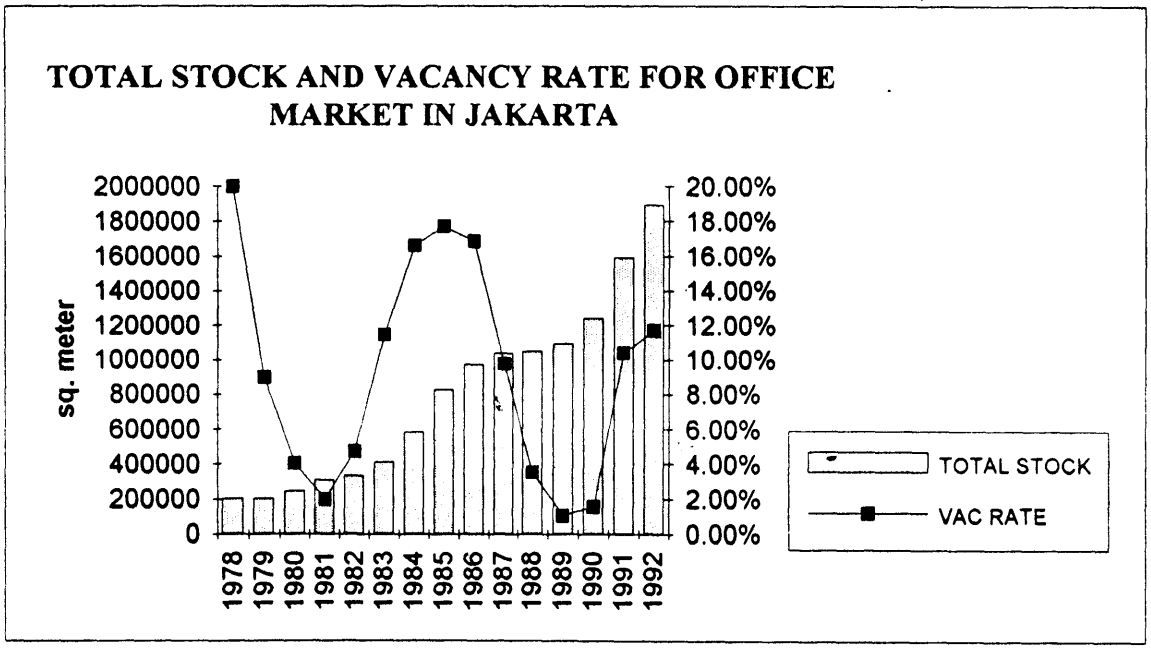


Figure 3.3 Total Office Stock and Vacancy Rate for Office Market in Jakarta

Source Procon Indah/Jones Lang Wootton, Colliers Jardine

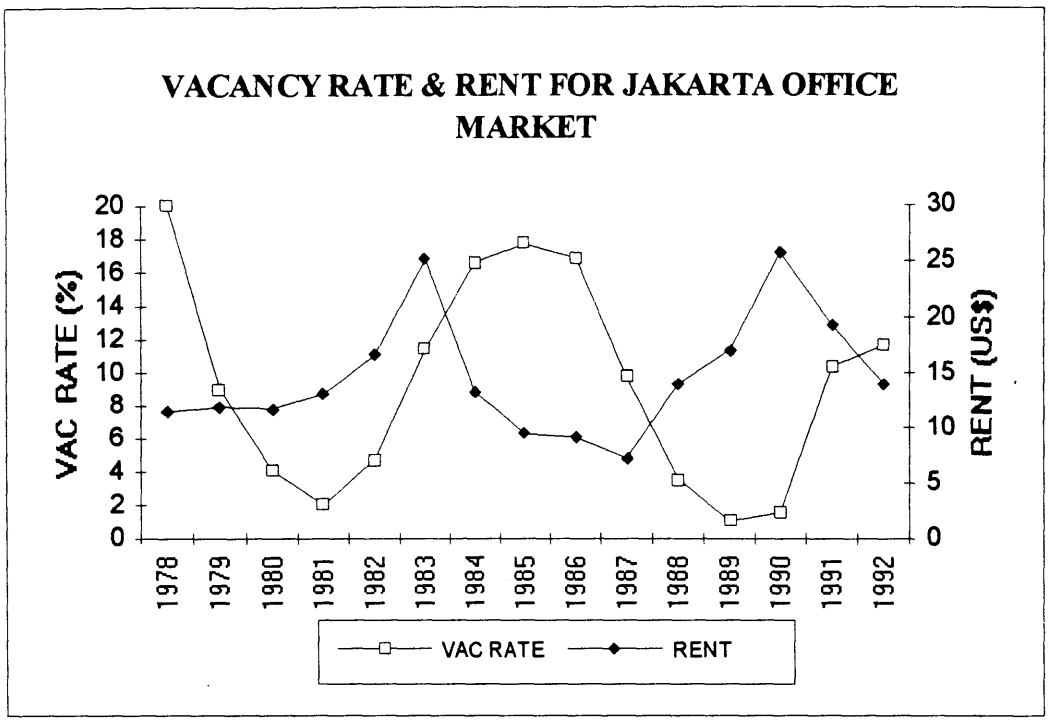


Figure 3.4 Vacancy Rate and Rent in Real Term for Jakarta Office Market
Source: Procon Indah / Jones Lang Wootton and Colliers Jardine

The market then experienced oversupply conditions. By the time new completion reached the highest levels, total employment, which includes office employment, the target market of office real estate, experienced slow growth. Figure 3.2 and 3.3 show that vacancy rates soared high especially around the 1985 boom. Accordingly, the vacancy rates were low during the low development activities as firms started to occupy the available office spaces.

Rents, as shown in Figure 3.4, seemed to follow some pattern of lagged cycle with respect to that of the vacancy rates. The rent rose to the highest point within two years after the vacancy rate dropped the lowest. In the reverse situation, the rent reaction was in the opposite direction but the lagged period appeared to be similar.

As reported by commercial brokers, confirmed office supply for the next three years can reach 460,000 square meters, not to include about more than 500,000 square

meters of potential new supply. If this prediction of new supply will materialize, then the vacancy rate may be still on the way to another peak, while rent is expected to drop.

The next three chapters will discuss how the market behaved the way it has been exhibited in these charts. The factors that determine the market and how they interact will be analyzed and modeled and the model will be used to forecast the future of the market.

**References**


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[3] Didin Abidin Masud et. al, "Adu Cepat Memetik Laba," *Prospek, Weekly Economic News* (November 21, 1992), p. 18; *(in Indonesian).*

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# CHAPTER 4
# MACROECONOMIC ANALYSIS OF JAKARTA OFFICE MARKET

## Introduction

This chapter will start with an analysis of demand in the Jakarta office market. The determinants of demand and their behavior will be identified. Econometric models will be developed to analyze the correlation between these variables. These models will later be used to make forecasts of demand and to see the outlook of investment in this market.

## Determinants of Demand

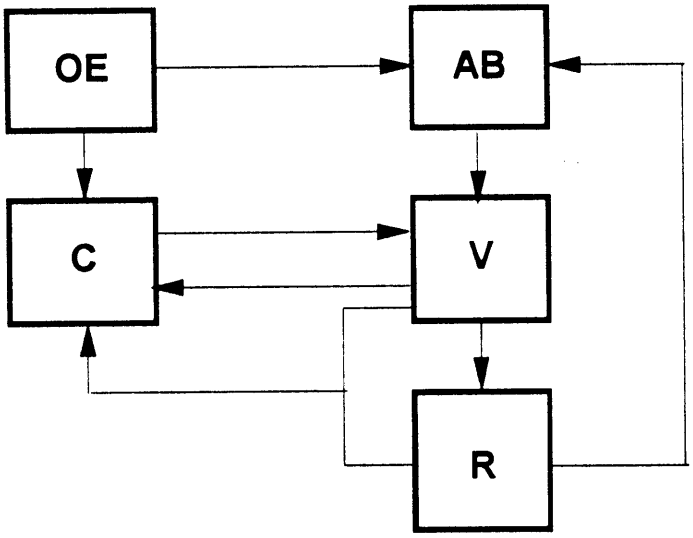
The demand for office space in a market is primarily determined by employment in the area or region that requires an 'office space'. This employment is referred to as office employment. The employment, hence the office employment, of a region is mainly determined by the region's economy. A change in office (or overall) employment , as the result of the change of the region's economy as a whole, is an exogenous variable that will create a demand shock to the office market.

One measure of demand in office market is absorption. Absorption is defined as the net change in total leased office space per period [1], measured in square meters in Jakarta. Although gross absorption measures the total leasing activity, at the same time it also measures the mobility of tenant or tenant turnover, thus cannot be considered as a correct measure of market demand. Therefore gross absorption will not be used in the analysis. Data on net absorption can be derived from the data of office stock and vacancy rate that are usually easy accessible to public.

In the short run, the net absorption is also affected by exogenous variables such as total stock of office and vacant space, and rent as the endogenous variable. The rent itself

is expected to react to the changes in vacancy, for example as the higher the vacancy the tighter the competition to get the office space rented. The rent affects the firm's decision on the space consumption and on how much the firm is willing to pay. This decision determines the net absorption or the demand of office space.

As demand increases, office space from existing space are absorbed and captures vacant spaces. The space then becomes more scarce and the rents would increase. The prospect on return on investments from rental income would encourage developers to start building. This, in turn, would affect the market's vacancy and rent and the cycle starts again (see Figure 4.1). The reverse occurs when demand declines.




| | |
|---|---|
| OE | OFFICE EMPLOYMENT |
| AB | ABSORPTION |
| V | VACANCY RATE |
| R | MARKET RENT |
| C | COMPLETION LEVEL |

Figure 4.1 Demand and Supply Flow Chart

## Estimating Office Employment

Office employment in Jakarta is estimated from the employment data obtained from Central Bureau of Statistics and Jakarta Statistical Office (see Table 2.2 ). The term office employment itself implies the use of an office space to perform tasks. Thus, the estimate of office employment can determined by examining whether or not the type of occupation require an office. Another way to estimate this is by examining the category of industry of firms that are likely to be housed in an office building and therefore occupy office space [2].

Each industrial category or even each firm may have different type of occupation performed by its workers. In the U.S., this may be referred, in a very broad category, as white and blue collar workers. Office employment then suppose to consist of the white collar workers.

However, the white and collar distinction itself may not truly reflect the office and 'non-office' classifications. Some of these workers, such as technicians and salespersons may not actually need or may require working area other than desks or tables typically found in an 'office space'. In another situation, the office space used by workers doing 'office works' may not be located in a separate building or complex. The office space in this case is integrated as part of a facility. The occupation approach has to consider both office spaces: the one in a separate building, and the other as an office room in other types of buildings [3].

The offices of statistics in Jakarta actually provide data of employment by the type of occupation for Jakarta, in addition to the data of employment by industrial sector. The problems with these data are first that they are not published regularly every year, and second, there is no indication whether the occupations were performed in an office building or in an office room of other type of building.

The industry approach considers the type of industry that tend to occupy space in separate office buildings. In the U.S., such data are available based on surveys conducted by government agencies which recorded the number of workers in total and those who occupy separate administrative or auxiliary structures. Studies using this survey, such as that described by DiPasquale and Wheaton [4] suggested several conclusions on the distribution of office employment originated from each SIC. The study found that almost three-fourth of office employment were from Financial, Insurance, and Real Estate (FIRE) and service sectors, while the administrative components of manufacturing came in second. These ratios were then applied to estimate office employment in each category in each period. The problem here is the absence of such data for Jakarta from the statistical offices. Therefore, the employment data by the type of occupation will be used as a starting point.

Employment data by type occupation available for this analysis are those for 1985 and 1990 published by the Jakarta Statistical Office and Central Bureau of Statistics. The data are presented in the form of percentages. The types of occupation included in the data are managerial, administrative / clerical, professional / technical, services, sales, production, agriculture, and others.

As defined by the statistical offices, in general, workers under the category of managers and administrative / clerical are 'office' workers which include those working in office buildings and in other types of buildings. Some professionals / technical, may be categorized into office employment working in office buildings, while sales and service workers may buildings other than offices. Most of production workers and other category are not office employment.

At this point, it will be assumed that the 'office occupation' roughly consists of managers, most administrative, and some professional/technical workers. Thus, this would include those who occupy office buildings and those who do not. From the percentages of the 'office occupations' in 1985 and 1990, the estimates of percentages of

office employment that will be used in this analysis will be derived. The summary of 'office occupation' as well as the estimates are presented in Table 4.1.

Table 4.1 'Office Occupation' and Estimate of Office Employment

| | 1985 | | | | 1990 | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | %'OFF OCCPN' PER IND | EMP BY INDUST | 'OFF OCCPN' BY IND | 'OFF OCCPN' % TOT | %'OFF OCCPN' PER IND | EMP BY INDUST | 'OFF OCCPN' BY IND | 'OFF OCCPN' % TOT | EST % OFF EMP |
| 1 | 2 | 3 | 4 = 2 x 3 | 5 | 6 | 7 | 8 = 6 x 7 | 9 | 10 |
| AGRI | 2.7% | 37,207 | 998 | 0.34% | 3.7% | 31,634 | 1,178 | 0.29% | 4% |
| MINE | 25.3% | 24,276 | 6,130 | 2.11% | 13.0% | 7,786 | 1,012 | 0.25% | 9% |
| MFG | 10.1% | 293,576 | 29,531 | 10.15% | 9.7% | 602,900 | 58,327 | 14.33% | 10% |
| UTIL | 2.9% | 6,579 | 188 | 0.06% | 4.4% | 27,253 | 1,206 | 0.30% | 5% |
| CONST | 11.5% | 141,116 | 16,277 | 5.59% | 11.0% | 146,477 | 16,112 | 3.96% | 8% |
| TRADE | 5.7% | 642,282 | 36,779 | 12.64% | 6.1% | 871,499 | 53,178 | 13.06% | 12% |
| TSC | 9.0% | 192,589 | 17,333 | 5.96% | 9.0% | 212,636 | 19,137 | 4.70% | 10% |
| FIRE | 93.3% | 74,896 | 69,878 | 24.02% | 91.0% | 123,598 | 112,474 | 27.63% | 100% |
| PUBL | 12.7% | 851,461 | 108,502 | 37.29% | 14.3% | 912,334 | 130,819 | 32.13% | 9% |
| OTH | 6.6% | 4,764 | 314 | 0.11% | 50.2% | 2,432 | 1,221 | 0.30% | 28% |
| TOTAL | | 2,268,746 | 285,930 | | | 2,938,549 | 394,666 | | |

Source: 2 and 6 are calculated from the Jakarta Statistical Office and Central Bureau of Statistics, Employment by Type of Occupation.
3 and 7 are from Table 2.5, derived from the same source.

The survey by DiPasquale and Wheaton assumed that all workers under FIRE category are office workers. Based on the Census of Economy for Jakarta, also published by the Jakarta Statistical Office [5], the FIRES category also includes certain services such as accounting, legal, architectural consulting, advertising, information, and marketing. Based on the nature of the works performed, firms in this category require office spaces and very likely to be housed in an office building. Then the assumption that all (100%) of FIRES' workers occupy office space can be applied here. This is in fact close with the average 'office occupation' percentage in Table 4.1 and therefore will be used.

A report on Property Market Outlook by Procon Indah / JLW Research indicated the demand of office space by FIRES, trading and manufacturing as the top three industries based on their leasing deals in 1991 and 1992. This is exhibited in Table 4.1.

During these years, the employment in FIRES, manufacturing, and trading are approximately 133,000, 630,000, and 890,000 square meters, respectively. If the amount of space per worker is assumed to be the same for each category, then the percentage of demand (absorption) may also reflect the percentage of the number of working people seeking for space to work.

Table 4.2 Office Space Absorption by Top Three Industries
(% absorbed space)

| | 1990 | 1991 | 1992 |
|---|---|---|---|
| FIRES | 65 | 47 | 34 |
| Manufacturing | N/A | 25 | 19 |
| Trading | N/A | 6 | 23 |

Source: Procon Indah / JLW Research

The high demand from FIRES in 1991 is actually a drop from 65% the year before, following the 'booming' of financial firms as the result of government deregulation in the late 80s [6]. The drop of demand from manufacturing may be due to the slowing down of foreign investment in Indonesia, while trading experienced a big gain that lead the industry to high demand on prime office space. If the assumption that all (100%) of FIRES' workers are office workers and the figures in Table 4.2 are used, then: x% of 630,000 manufacturing employment = (19/34)*100%*133,000, or solving for x, x% = (19/34)*(133/630) = 11.7% Using the same approach for trading results in 10%.

The estimate for manufacturing is fairly consistent with the figures from Table 4.1. Considering a strong gain in trade and a more conservative outlook of foreign investment in manufacturing, then 10% for manufacturing and 12% for trading seems to be reasonable estimates to be used here.

In making the estimates for the other industries, there are several things that must be considered concerning government employees and the public sector in Indonesia. Table 2.5, Employment in Jakarta by Main Industrial Sectors, shows that public service sector accounts for about 30% of total employment, which is in fact the largest share of employment. As defined in the Census of Economy for Jakarta, businesses involved in this sector may be different than what might be under the same category in the U.S. In this case, this sector includes health care, education, radio and TV broadcasts, entertainment, and the likes [7].

Government employees also are expected to fall in this category. However, in Indonesia, there are employees of government agencies and there are those of state-owned firms. Together, they account for roughly 10% of the total employees [8]. Both have the status of government employees (or sometimes referred as civil servants). The main difference is that the government agencies deal with administrative tasks, while state-owned firms do technical or professional works. Government agencies are categorized under the public sector while state-owned firms are under the industry correspond to the type of service or works these firm provide. State-owned companies may be incorporated or may form a multi national joint ventures just like private companies.

In term of space use, in Indonesia, government agencies usually occupy their own buildings (government buildings). While state-owned companies may or may not occupy their own building. It is not too common that government agencies in Indonesia occupy commercial offices. According to a report on office properties in Indonesia published by Indonesian Business Data Centre in 1991, in 1989 - 1990, only 0.43% of commercial office spaces in Jakarta occupied by government agencies [9]. This shows a very low occupancy and should confirm the assumption that government agencies, although included in the office employment, usually occupy government buildings and therefore should be excluded from the office employment in public sector.

Utilities: power, gas, and water, are controlled and operated by government jointly between the Ministry of Public Works, City of Jakarta, and state-owned companies. While in the transportation, communication, and storage sector (TCS), the subsector of communication and major air, train, and major sea transportation are also controlled and regulated by the government. These sectors are expected to have steady growth along with the increasing number of service users. The estimate of office employment ratios are shown in Table 4.1.

Like the utility sector, the mining industry is also highly controlled and regulated by the government, although in this case there are foreign companies forming joint ventures with state-owned companies. Oil industry, the main subsector of mining industry, peaked in 1981 and 1982 in which the export value during those years accounted for 80% of the total export of Indonesia [10]. The employment in this industry as a whole was expected to expand. The growing number of foreign expatriates in this industry translated into high demand of office space, but it was not very clear about the demand of office space by the Indonesian counterpart: whether or not these state-owned companies tend to occupy their own building. A more 'conservative' estimate of 9%, that is closer to the ratio of office employment in 1990, would be taken and reflect the cyclicallity of this industry.

In the construction industry, the periods around 1985 and 1990 were the 'booming' in real estate which resulted in high level of construction of buildings [11]. The cyclical characteristic of this industry suggests to take a lower ratio of office employment that reflect the average scenario of the employment in this industry.

In public sector, the number, size, and type of firms that are likely to occupy an office building are difficult to track and to estimate. These firms could be private firms such as small to medium medical clinics, some radio broadcast stations, private and independent schools or vocational courses. A rough estimate of 9% that exclude the

Table 4.3 Office Employment in Jakarta

| | TOTAL EMPLOYMENT | TOTAL OFFICE EMPLOYMENT |
|---|---|---|
| **1976** | 1,533,586 | 189,490 |
| **1977** | 1,563,608 | 194,297 |
| **1978** | 1,758,218 | 214,778 |
| **1979** | 1,764,038 | 222,917 |
| **1980** | 1,931,114 | 244,030 |
| **1981** | 1,963,218 | 248,087 |
| **1982** | 2,010,321 | 249,046 |
| **1983** | 2,186,965 | 265,497 |
| **1984** | 2,259,508 | 282,391 |
| **1985** | 2,268,747 | 291,666 |
| **1986** | 2,302,527 | 312,123 |
| **1987** | 2,477,648 | 341,816 |
| **1988** | 2,536,056 | 351,256 |
| **1989** | 2,611,412 | 361,043 |
| **1990** | 2,938,549 | 407,113 |
| **1991** | 3,051,133 | 426,102 |
| **1992** | 3,157,806 | 436,026 |

| **Notes** | |
|---|---|
| **Percentage of Industry** | |
| Agriculture | 3.6 |
| Mining | 9 |
| Manufacturing | 10 |
| Utilities | 4.8 |
| Construction | 7.6 |
| Trading | 12 |
| TSC | 9.9 |
| FIRES | 100 |
| Public Services | 9 |

Source: Estimated from Central Bureau of Statistics and Jakarta Statistical Office.

employee of government agencies would be used in this analysis. The computation of office employment estimates are summarized in Table 4.3 below.

Table 4.3 shows that in the long run, during the period of observation from 1977 to 1992, both the overall total and office employment has grown more than double at fairly similar growth rates. Although the growth rates per annum of office employment in general are slightly higher than those of total employment, the five year growths are quite similar. In the last five years, office employment consistently account for 14% of the total employment.

## Analysis of Office Space Market in Jakarta

As mentioned earlier, absorption in this analysis is net absorption, which is the net change in total leased (occupied) office space from period to period, denoted as $AB_t$. The

occupied space is the portion of office stock that is actually occupied at certain period of time, $OC_t$ ,that can also become a measure of demand. The unoccupied portion is expressed in vacancy rates, $V_t$ as the percentage of office stock at one period of time. The office stock or total office space in a period, $S_t$, is determined by the new supply of stock or the new office building completed, $C_t$, ready to be leased or operated, and the amount of space demolished. These relationships are expressed in the following identities:

$$S_t = (1-\delta)\, S_{t-1} + C_t \qquad (4.1)$$

$$V_t = (S_t - OC_t) / S_t \qquad (4.2)$$

$$OC_t = OC_{t-1} + AB_t \qquad (4.3)$$

in which $\delta$ denotes the rate of demolition. In Jakarta, however, the demolition rate for prime office is basically negligible. Land clearing for these office usually involved houses, office buildings at lower class, or other types of buildings. In such case, there is no record that represent a 'market' demolition rate for offices in general. For simplicity of this analysis, it is assumed that this rate would be zero.

The demand of office space is driven by office employment. In order to see this relationship, the correlation between office employment with absorption and occupancy must be examined. Table 4.4 presents the measures of the three identities along with the other office market indicators. Figure 4.2 graphically shows the change of employment and absorption level.

From Figure 4.2, there appears some kind of relationship between the change in office employment and absorption level. A series of peaks is shown in the graph which occur in 1981 following the growth of office employment the year before, then in 1985 (two-year lag), and expected to be in 1992 following the office employment growth in 1990. Low growth rates of office employment occurred in 1982 and 1988 coincide with the low points of absorption. These years were the periods in which the GDP and also GRDP of Jakarta were low, especially in 1982 when it was the lowest. Some inconsistencies occur around 1987, in which the growth of office employment was quite

Table 4.4 Jakarta Office Market Indicators

| YEAR | YEARLY SUPPLY | TOTAL STOCK | VAC SPACE | VAC RATE | OCCPD SPACE | ABS | CHG IN ABS | OFF EMP | CHG OFF EMP | % CHG OFF EMP | RENT 1992 $ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1975 | 40,000 | 103,525 | | | | | | 189,490 | | | |
| 1976 | 65,000 | 168,525 | | | | | | 194,297 | 4,807 | 3% | |
| 1977 | 28,300 | 196,825 | | | | | | 214,778 | 20,481 | 11% | 11.46 |
| 1978 | 3,600 | 200,425 | 40,085 | 20% | 160,340 | | | 222,917 | 8,139 | 4% | 11.88 |
| 1979 | 0 | 200,425 | 18,038 | 9% | 182,387 | 22,047 | | 244,030 | 21,113 | 9% | 11.74 |
| 1980 | 47,000 | 247,425 | 10,021 | 4% | 237,404 | 55,018 | 32,971 | 248,087 | 4,057 | 2% | 13.05 |
| 1981 | 60,000 | 307,425 | 6,149 | 2% | 301,277 | 63,872 | 8,855 | 249,046 | 959 | 0% | 16.59 |
| 1982 | 26,380 | 333,805 | 15,799 | 5% | 318,006 | 16,730 | (47,143) | 265,497 | 16,451 | 7% | 25.17 |
| 1983 | 77,561 | 411,366 | 47,199 | 11% | 364,167 | 46,161 | 29,432 | 282,391 | 16,894 | 6% | 13.25 |
| 1984 | 173,354 | 584,720 | 97,217 | 17% | 487,503 | 123,336 | 77,175 | 291,666 | 9,275 | 3% | 9.47 |
| 1985 | 245,200 | 829,920 | 146,955 | 18% | 682,965 | 195,462 | 72,126 | 312,123 | 20,458 | 7% | 9.13 |
| 1986 | 144,136 | 974,056 | 163,873 | 17% | 810,183 | 127,218 | (68,244) | 341,816 | 29,693 | 10% | 7.21 |
| 1987 | 64,490 | 1,038,546 | 101,460 | 10% | 937,086 | 126,903 | (315) | 351,256 | 9,439 | 3% | 14.00 |
| 1988 | 9,550 | 1,048,096 | 37,009 | 4% | 1,011,087 | 74,001 | (52,902) | 361,043 | 9,787 | 3% | 17.06 |
| 1989 | 44,860 | 1,092,956 | 11,434 | 1% | 1,081,522 | 70,435 | (3,566) | 407,113 | 46,070 | 13% | 25.75 |
| 1990 | 147,667 | 1,240,623 | 19,475 | 2% | 1,221,148 | 139,626 | 69,191 | 426,102 | 18,989 | 5% | 19.33 |
| 1991 | 352,816 | 1,593,439 | 165,334 | 10% | 1,428,105 | 206,957 | 67,331 | 436,026 | 9,924 | 2% | 14.00 |
| 1992 | 300,600 | 1,894,039 | 220,934 | 12% | 1,673,105 | 245,000 | 38,043 | | | | |

Source Procon Indah / JLW Research
Colliers Jardine
Jakarta Statistical Office
Central Bureau of Statistics

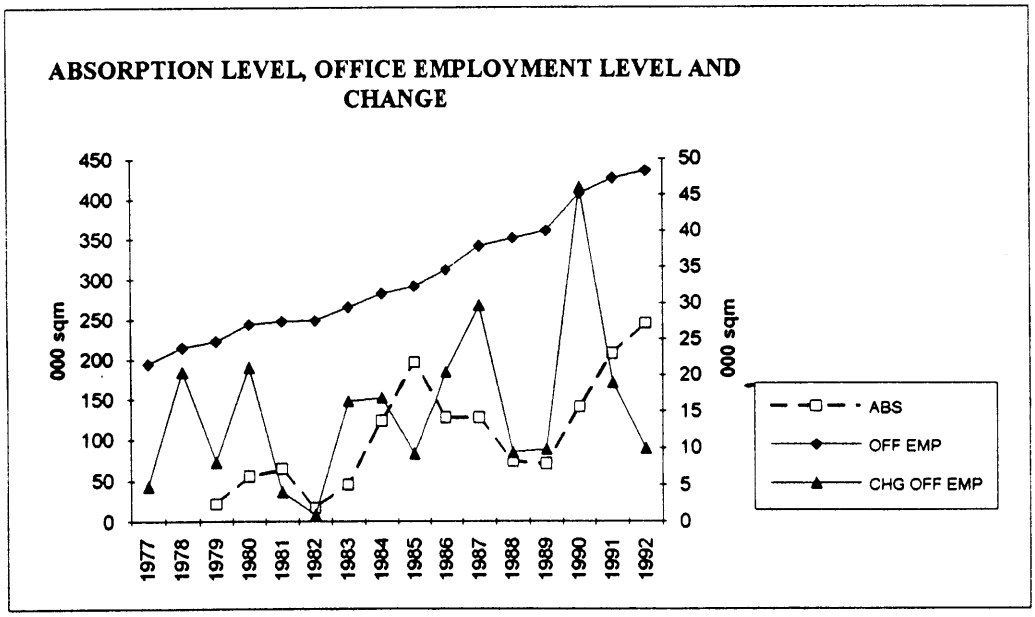



Figure 4.2 Absorption Level, Office Employment Level, and Office Employment Change

strong but was not followed by the absorption. Overall, the office employment shows a strong pattern of growth, while the commercial office market in the late 70s was relatively new and did not show a strong absorption level.

Demand constraint was suspected during the early years. The 'modern' real estate industry in Jakarta which is considered started in the early 70s may not provide adequate supply of office space, while state-owned companies and government agencies occupied their own buildings. Private companies may rent small offices or houses converted into offices, which cannot be tracked down.

The correlation between the change in office employment and absorption was also analyzed statistically. A model that assumes the instantaneous adjustments of absorption to the change of employment was developed with 1 year lag: $AB = \alpha + \beta\ \Delta OE_{t-1}$, for 14 years observations. At 95% confidence level, this resulted in a very poor fit correlation expressed in a low R-square (.21). Thus, the relationship was not as simple as appear to be on the graph. The two variables, employment and space, do not move in a perfect correlation. This may be due to the differences in space use per worker for different type of occupation or the change of occupational mix over time.

The change of occupied space is the net absorption, as shown in identity equation 4.3. A growing firm may want to expand the space they occupy. However, this may cost the firm even more if the rent per square meter of the additional space is higher than what the firm pays now. Then in the anticipation of this and its future growth , the firm may want to rent more space per worker than they need, so not only does the firm may save some money but also would maintain contiguous space. The notion that firm tends to do this, becomes the basis of the next model. In this model, if there is no cost to occupy office space, then a firm that employs OE workers would demand a desired space at the level of OC*. This relationships is illustrated in the following equation:

$$OC^*_t = \alpha_0 + \alpha_1\ OE_{t-1} \qquad (4.4)$$

Since not all of firms can make the adjustment to this level of occupancy, then there should be a fraction of $\tau_1$ that do adjust, because they are in the position and want to do so. It will also be assumed that firms in that situation will adjust their occupied space.

Then the net change of occupied space, or net absorption, is the fraction of the difference between the desired level and the current space consumption. The identity 4.3 will be expanded as:

$$AB_t = OC_t - OC_{t-1} = \tau_1 \ [OC^*_t - OC_{t-1}] \qquad (4.5)$$

The substitution of Equation 4.4 to 4.5 will be expressed as:

$$AB_t = \tau_1 \ [(\alpha_0 + \alpha_1 \ OE_{t-1}) - OC_{t-1}] \quad \text{or}$$

$$AB_t = \tau_1\alpha_0 + \tau_1 \ \alpha_1 \ OE_{t-1} + \tau_1 \ OC_{t-1} \qquad (4.6)$$

The term within parentheses ( ) is $OC^*_t$ which represents the potential office space demand, or the amount of space that firms would demand if there is no cost in obtaining that [12]. In the regression analysis of Equation 4.6, the coefficient of $OC_{t-1}$ is expected to have negative sign to match the identity, while office employment is expected to have positive effect to the absorption.

Since $OC^*_t$ is the amount of space that office occupier want to occupy, then what Equation 4.6 shows that in each period there is a fraction $\tau_1$ of office occupier making an adjustment of space they occupy toward the desired amount of space. This becomes the basis of the forecast of office space demand.

Equation 4.6, however, suggests that the adjustment-desired by these office occupier can be made without a change in the cost to obtain it. There is a linear relationship between the growth of office employment and the amount of space per worker represented by the coefficient $\alpha_1$. Usually there is a provision in the leasing agreement that rent may be lower if the amount of space to be leased is larger than certain level of area. In the case of the Jakarta office market, the lease term commonly signed in the contract is between 1 and 3 years, which is very short compare to longer lease terms in

the U.S. Tenants then can negotiate the rent with landlord if they would like the renew the agreement. Therefore, the desired occupancy model should also incorporate rent. Equation 4.4 is now expanded as follows:

$$OC_t^* = \alpha_0 + (\alpha_1 + \alpha_2 R_t)OE_{t-1} \qquad (4.7)$$

Substituting this equation to Equation 4.5, following the same steps as the previous model, then the model becomes:

$$AB_t = \tau_2[\{\alpha_0 + OE_{t-1}(\alpha_1 + \alpha_2 R_t)\} - OC_{t-1}] \quad \text{or}$$

$$AB_t = \tau_2\alpha_0 + \alpha_1 OE_{t-1} + \alpha_2(R_t * OE_{t-1}) + \tau_2 OC_{t-1} \qquad (4.8)$$

in which the term within { } is the $OC^*_t$ , the desired amount of space to occupy. The coefficient of $OC_{t-1}$ , based on the identity, is also expected to be negative in the regression analysis.

The term within the parentheses ( ) is the amount of space, in square meter, per worker as a function of rents. A study by DiPasquale and Wheaton for 12 largest cities in the U.S. concluded that the correlation between rent and space per worker is significant and negative. This suggests that during periods of high rent due higher scarcity of space (low vacancy), firms often increase their space uses per worker. This may even be done by firm anticipating to grow and expand and may be taking advantage of the soft market, so that they rent more spaces than what they actually needed at that time ('to bank' the space) [13].

What this study suggests for Equation 4.8 is the expected negative sign for $\alpha_2$ Such relationship suggests that more space expected to be leased, hence increase the space per worker, when the rent becomes lower. Table 4.5 shows the results of regression analyses for Equations 4.9 and 4.10.

The R squares of these equations shown in Table 4.5 indicate medium fit at 95% confidence level. The Rs in Equation 4.8 are the historical market rate of asking net rents

Table 4.5 Statistical Regression Results for Absorption Model

| Independent Variables | Eqn 4.9 coef. | t-stat | Eqn. 4.10 coef | t-stat |
|---|---|---|---|---|
| **Intercept** | -466,481 | (-1.623) | -585,090 | (-2.174) |
| **OE** | 2.513 | (1.73) | 3.275 | (2.37) |
| **OC** | -0.277 | (-1.202) | -0.351 | (-1.646) |
| **R*OE** | | | -0.014 | (-1.824) |
| **R sqr** | 0.610 | | 0.707 | |
| **Observations** | 14 | | 14 | |

obtained from commercial brokerage firm. There is no data on the average actual rent paid in this market. These data could have reflected a better estimate of the expected dynamics of rent movements and space adjustments. For this analysis, however, these data are assumed to be reasonably good proxies.

From Table 4.5, Equation 4.6 can be fully represented as follows

$$AB_t = -466{,}481 + 2.513\ OE_{t-1} - 0.277\ OC_{t-1}\ ,\ \text{or}$$
$$AB_t = 0.28\ [\ (-1{,}684{,}047 + 9.07\ OE_{t-1}\ ) - OC_{t-1}\ ] \qquad (4.9)$$

while Equation 4.8 becomes:

$$AB_t = -585{,}090 + 3.275\ OE_{t-1} - 0.014\ (R_t^*\ OE_{t-1}) - 0.35\ OC_{t-1}\ \text{or}$$
$$AB_t = 0.35\ [-1{,}671{,}686 + OE_{t-1}\ \{9.36 - 0.039\ R_t\ \} - OC_{t-1}\ ] \qquad (4.10)$$

Equation 4.9 suggests that the average space per worker is 9 $m^2$. There are 28% of these office occupier each year who make adjustment to the space they occupy at the same cost or rent. While Equation 4.10 suggests a higher rate of 35% of adjustment of office space occupancy. Equation 4.10 incorporates provision for rents for different leased area. This equation indicates that the relationship of space per worker and rent is represented as:

space per worker = 9.36 -0.04 *Rent. Therefore, when there is no cost to occupy a space, all firms in the market tend to use an average of 9.4 $m^2$ for their workers.

Historically, the range of net rent in real term in the span of 14 years of the observation is from US $7.2 - $26. Applying this to the space per worker to rent equation will result in the decrease of the amount of space per worker from 9.1 $m^2$ to 8.3 $m^2$. Current market average of net rent of $17 will yield 8.7 $m^2$ of space per worker. The lowest average rent of $7.20 occurred in 1987. From the perspective of the national economy, this coincided with the 31% of Rupiah devaluation late in the previous year. This may have a great effect to the willingness of firms to pay rents which are quoted in US dollar. A series of other events in the same and previous years also affect the real estate markets directly or indirectly which may force landlords to lower the rents.

Equation 4.9 also suggests that the rent movement within each year would also result in similar reaction of space consumption. From the stand point of price, this shows an inelasticity, but from the tenants' perspective there is a strong incentive to rent just a little bit more space per worker for a 'bargain', if the tenant can negotiate with the landlord in the leasing agreement. Lease terms in Jakarta in the past few years range from 1 to 3 years. The most common terms are 2 or 3 years. This may encourage tenants to negotiate this space demand adjustments in a very near future. From Equation 4.9, there are 35% of these firms would do just that. They might have been those whose rents are rolling and who are in legal position to move and intend to renew the leases. This seems to be consistent with the average length of lease which can be intrepreted that 33 - 50 % of all leases would expire each year.

With this incentive, firms may increase their office space demand even more. The decisions may be determined by the management concern about the economy in general, the firm's likelihood to grow and the tendency of the firms to do their own tight money policy during the 'slow' economy.

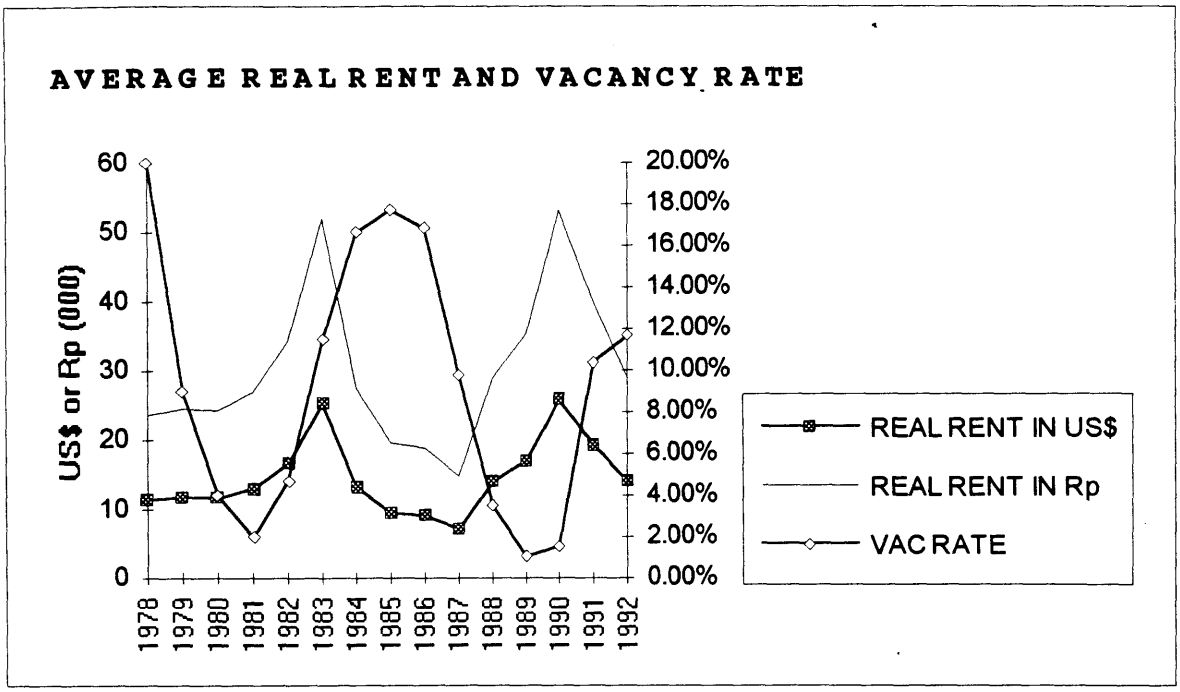



Figure 4.3 Average Rent at 1992 Constant Price and Vacancy Rate in Jakarta Office Market

Source: Procon Indah /JLW Research and Colliers Jardine

Using Equation 4.9, given the initial market occupancy, level of office employment and the average market asking rents, not only can absorption level be determined but also the space per worker. However, the inferences this far still isolate the dynamic of rent movements with vacancy. This is particularly important when making a forecast for demand. If the movements of rent in the market is forecastable, then given the growth of employment from the national macroeconomic projection, office space demand can be forecasted. This will be discussed in the following section.

## Rent Movements and Vacancy in the Jakarta Office Market

Vacant space in a rental office building affect the way landlords market the space and negotiate the rent to prospective tenants. When the market is soft, in general competition among landlords to get tenants and to have their office space leased becomes

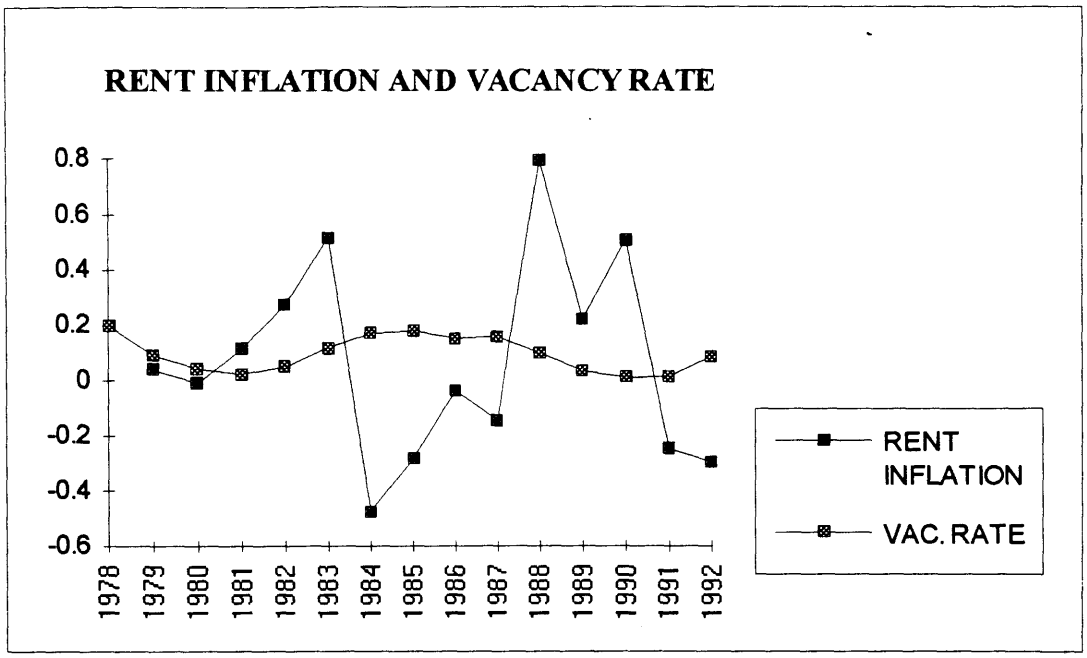



Figure 4.4 Rent Inflation and Vacancy Rates in Jakarta Office Market

tighter. The 'intuitive' respond of landlords to the market situation is to lower the rent. If a landlord insists on a higher level of rent, then there is a risk that the space would take longer to get leased. Having the office spaces vacant means not only that landlords still have to pay the basic operating expenses of their buildings but more importantly, they have to incur the opportunity cost for not having the space leased. Thus, vacancy level in the market is expected to affect rent movements.

Figure 4.3 shows the average rent in real term at 1992 constant price with the vacancy rate in the market while Figure 4.4 shows the rent inflation and vacancy rates. There appears to be some kind of lagged negative relationship between real rents and vacancy rates as demonstrated in figure 4.3. Rents did rise within about 2 years after vacancy dropped to the lowest rates in each of the 'trough' in the graph. The reverse occured when vacancy reached its peaks. Similar kind of negative relationship also indicated in Figure 4.4. The more the number of vacant offices in the market (the higher market vacancy rate), the more landlords probably have to accept lower rents, or from the

tenants' perspective, the less they are willing to pay for the space than when the space is scarce. As discussed above, there are basic operating expenses as well as opportunity costs to incur. While the basic expenses should be relatively easy to determine, it is the opportunity cost that determine how landlord should optimize the tradeoffs between lowering the rent and have the space rented sooner, with maintaining the rent higher but have to wait longer.

In negotiating the rent, there would be a level at which landlords and tenants agree upon. This 'equilibrium' rent is the target rent that landlords are willing to accept or that tenants are willing to pay. As discussed above, this target rent is affected by vacancy rate as shown in the following equation:

$$R^*_t = \alpha_0 + \alpha_1 V_{t-1} \qquad (4.11)$$

If this is the target rent in the market, then the market rent moves toward this at a rate of $\mu$. The relationship between actual change of the market rent and the movement toward the target rent is expressed as:

$$R_t - R_{t-1} = \mu [R^*_t - R_{t-1}] \qquad (4.12)$$

Substituting Equation 4.11 to 4.12, then rearrange for regression analysis:

$$R_t - R_{t-1} = \mu [(\alpha_0 + \alpha_1 V_{t-1}) - R_{t-1}] \qquad (4.13)$$

$$R_t = \mu\alpha_0 + \mu\alpha_1 V_{t-1} + (1-\mu)R_{t-1} \qquad (4.14)$$

The results of the regression analyss for the model are presented in Table 4.6

Table 4.6 shows that Equation 4.15 has statitistically medium fit R square and 2 out of 3 coefficiencts that are statistically significant. The regression gives the expected signs for the variables. This model can be written in full as follows:

$$R_t = 17.91 - 59.78 V_{t-1} + 0.17 R_{t-1} \qquad \text{or}$$

$$R_t - R_{t-1} = 0.83 [(21.57 - 72.02 V_{t-1}) - R_{t-1}] \qquad (4.15)$$

The terms within brackets ( ) in Equations 4.15 represent R* or the levels target rent in real term. This can be considered as the target structural rent that eventually set the market rent in equilbrium.

Table 4.6 Statistical Regression Results for Vacancy Rent Adjustment Model

| Independent Variables | Eqn. 4.15 coef | t-stat |
|---|---|---|
| **Intercept** | 17.91 | (4.582) |
| **V** | -59.78 | (-3.548) |
| **R** | 0.17 | (0.834) |
| **R sqr** | 0.626 | |
| **Observations** | 14 | |

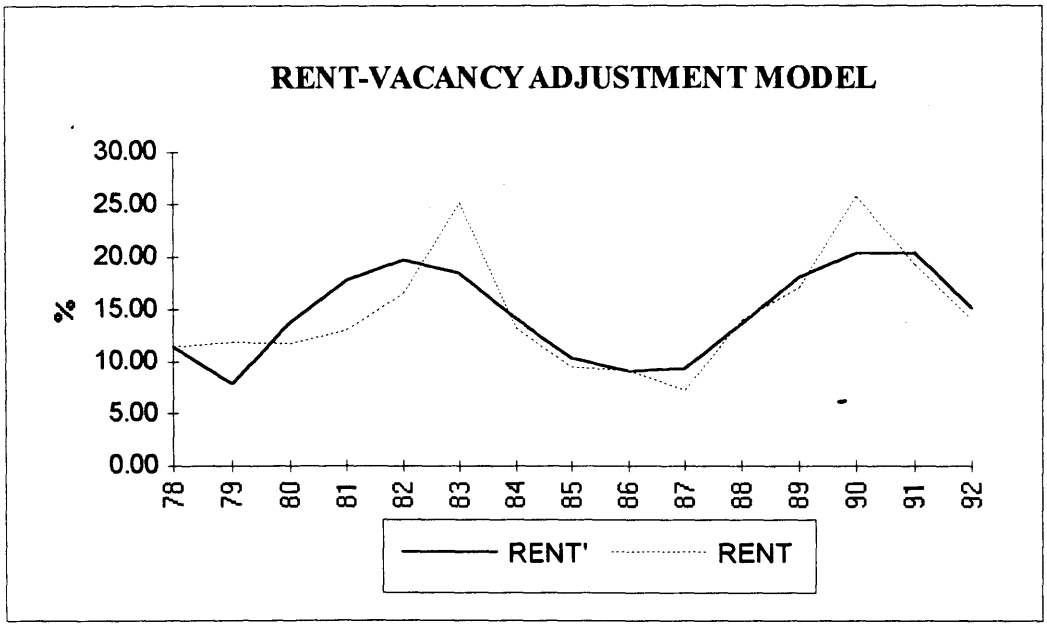



Figure 4.5 Rent - Vacancy Adjustment Model

If vacancy rate of 11.67% in 1992 is used, then the target rent would be $13.17. If the current market rent is less than R*, say $12.17, then the rent would rise $.83 during the year until the stable level was reached. When the vacancy rate changes again, then the market will have a new target market and the rent adjusts toward that level. If the current market rent is greater than R*, then the reverse situation occurs. Rent would drop until reaching the stable level again. Given the vacancy rates in the Jakarta office market and the earliest available market rent data as the initial rent will result in a series of rent values estimated by the model (Rent ' ) which are shown in Figure 4.5. The graph seems to move similarly with the actual average rent in Jakarta.

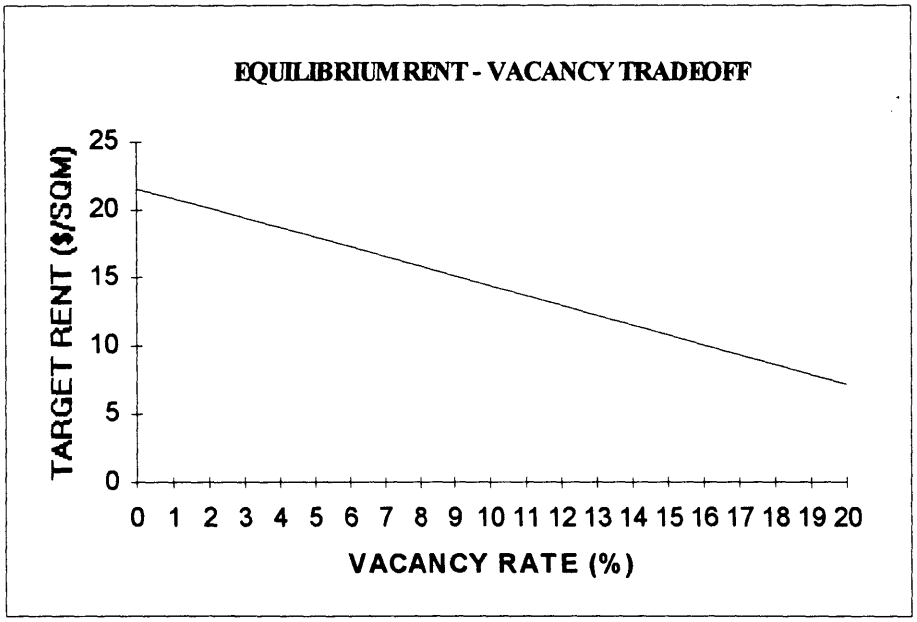



Figure 4.6 Equilibrium Rent-Vacancy Tradeoffs

Figure 4.6 shows the relationship between target rent and vacancy rate. The target rent will be $14.80 if historic average vacancy rate of 9.4% is applied. When the vacancy rate was high such as 20% in 1978, the market rent moved toward a target rent of only

$7.17. On the other hand, during a tight market when vacancy went down as low as 1%, then the target market rent became $20.85.

This model suggests that rent should be lowered when vacancy rate in the market rises. By doing this landlords may hope that the time the space remain unleased would be shorten. In the extreme case, if landlords reduce the rent to zero then the space may be instantaneously rented. There would be no opportunity cost, but at the same time no rental income. This is the tradeoff that landlord must deal with in order to maximize the target rents and minimize the opportunity costs or lease-up time.

## Analysis of Office Space Supply

The supply of office space in the market is measured by the amount of office space, in square meter, completed each year. Over time,. this represents the flow of movement of new yearly supply of the market. The total stock of office space in any year then follows the identity Equation 4.1. As discussed in the previous section, demolition rate of office space is considered to be neglible. For the vast majority of modern prime offices in Jakarta built within the period of the data, most of the demolition involved houses or small commercial structures. Then the total stock of office space is simply the sum of new completion and the historical stock.

The aggregate movements of the new completion represent the trend of office suplply. Ideally, the period of the data should be 'long' enough to see the pattern of office supply cycles which can be important in making forecast.

The main sources of data in this case, are major commercial brokerage firms based on their deals or research by their marketing research divisions. These data, coming from commercial brokerage firms, could be considered as being biased. However, since there are more than just one source, then the data can be cross checked and a compilation of 'more objective' and workable data of the market can be produced.

There are also data from the city of Jakarta published in the Jakarta in Figures about the number of building permit issued each year. The number of permit issued published from this source usually include all types and class of office buildings. These could have been a better set of data. However, more detail and critical information about the projects, such as the floor area or alternatively, the value and the unit cost of the projects from which the floor area can be estimated, are not available. In addition, there is no information on the date of completion of the buildings after the permit was issued.


Figure 4.7 New Completion and Vacancy Rate for Office Market in Jakarta

This leaves the data from the brokerage firms to be used for this analysis. These sources actually provide the data of new supply of commercial office space per year that also reflect the completion of office buildings construction. Since this thesis discusses commercial office buildings, then the data from the brokerage firms are considered quite appropriate for analysis purposes.

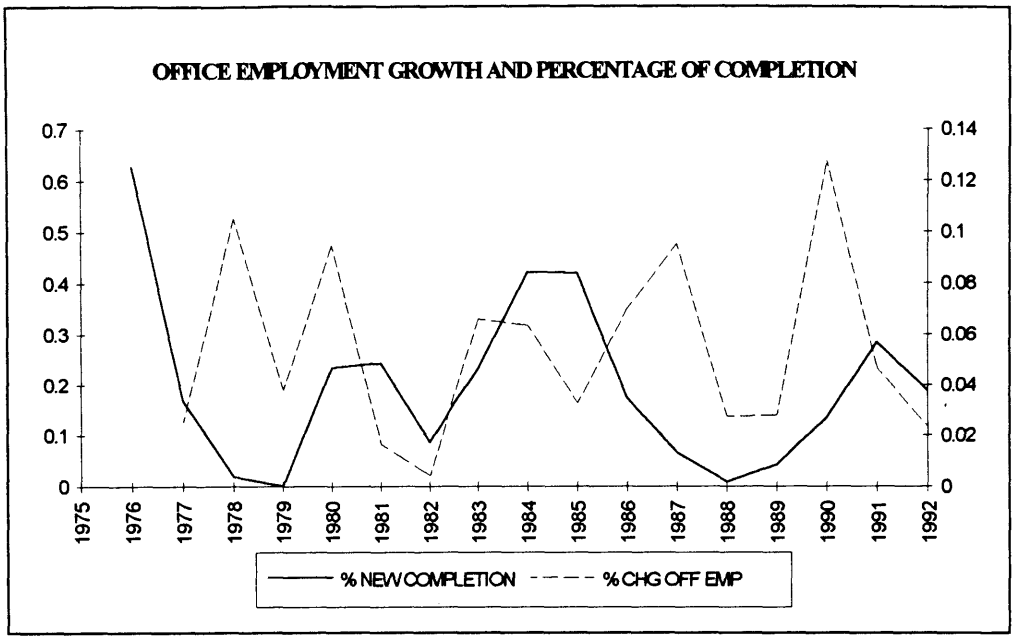



Figure 4.8 Office Employment Growth and Percentage of New Completion

Figure 4.7 shows that there was very low level of new completion or construction activities during the late 70 and early 80s. During this period the level of total office stock was also very low, yet office employment grew quite rapidly during that period as shown in Figure 4.8. Supply constraint was suspected during these years. But another argument would be the low absorption of commercial office space due to the fact that most of the office employment growth was in the government sector, hence most of the office buildings built were government offices.

There seemed to be slight increase in office space demand in the early 80s and firms started to lease up the available office spaces. As the result vacancy rates started to drop and then construction started picking up. There might be an anticipation of a better economy as Indonesia entered the Third Five Year Development Plan. Development in the office market until 1982 seemed not being fast enough, as shown in Figure 4.9, that most of the office space absorbed were from the previous vacancies. In this period, supply constraint that might occur may originate from the approval process in the development

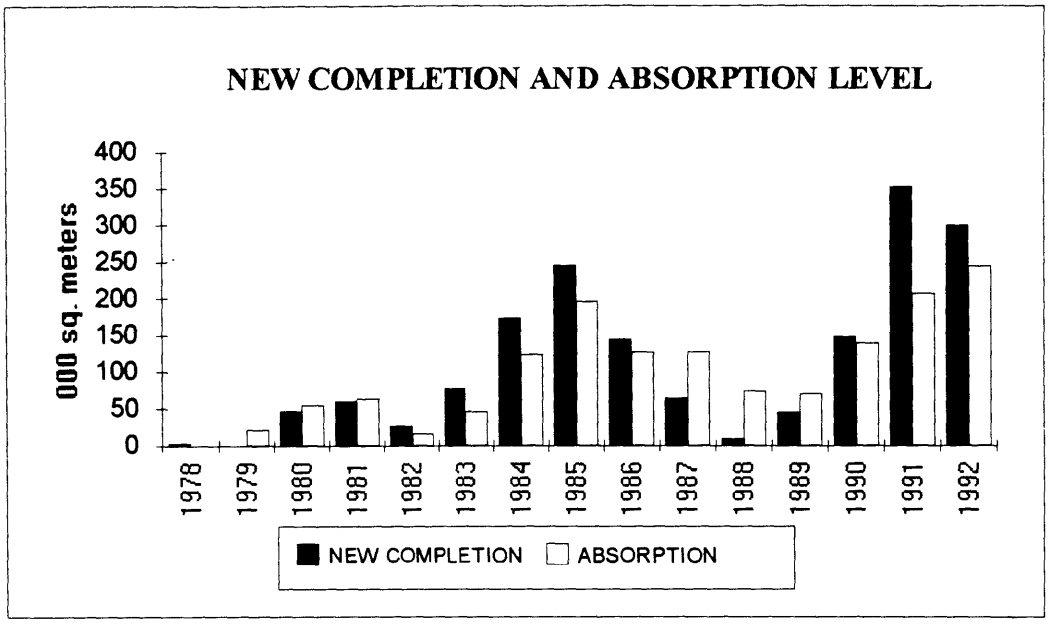



Figure 4.9 New Completion and Absorption Level

that usually takes about 5 to 12 months between developers' investment decisions and the approval to build and use a building issued by the city [14].

The anticipation of better economy seemed to encourage developers to build at quite a high rate during the period between 1981 and 1985. But as oil crisis hampered the economy in 1982, the office market hit another low point. The vacancy rate within the same period followed development completion level really close and, therefore, always high. In other words, the buildings completed never reached their target occupancy. Here, vacancy rate and completion level moved together. Figure 4.8 shows during the same period, the growth rate of employment was actually declining with the exception of that in 1982. This suggests that development activities were speculative.

This development activities led to a 'boom' in 1985. The total office stock had reached a level that was almost 3.5 times that in 5 years ago or 8 times 10 years ago (see Table 4.4, or Figure 4.9). Vacancy rates was approaching 20% during this period and the market started to consolidate again. When completion level started to decline, so did the

vacancy rate. The very low vacancy rate in the market encouraged developers to build again. This time absorption level was better and vacancy did not rise at least until approximately 1 year later.

Vacant space, along with new completion, makes up the new available space in the market to be absorbed. Then absorption also become an important factor in making investment decisions for development. But perhaps developers or investors would be interested in looking at their potential returns on their investments. Then they would like to see the performance and future projection of rents as well. Rents, as discussed in the previous section, adjust to vacancy. Then, vacancy along with absorption can also be considered as a measure of how well the market responds to the change in demand. This information can be used by developers to determine how much they want to invest. In other words, what level of completion they want to achieve.

If the desired level of completion is C*, then this level would be determined by vacancy and absorption levels. In addition, this level of completion would also be detemined by the level of stock. The construction activities should be different in a market with different level of total stock. The level of completion would be determined at the stock level at the time in which developers made their decisions and estimates of future situation as well as market performance. The relationship can be expressed as follows:

$$C^*_t = \alpha_0 + \alpha_1 S_{t\text{-}lag} + \alpha_2 S_{t\text{-}lag} V_{t\text{-}lag} + \alpha_3 AB_{t\text{-}lag} \qquad (4.16)$$

Since permit and construction process may take about 2 to 3 years then 2 year lag would be used in Equation 4.16, which is also statistically proven to yield the best model result.

In this model, using the same rationale in the absorption and rent adjustment models described in the previous section, the rate at which the desired level of completion would be achieved is shown in the following:

$$C_t - C_{t-1} = \tau_3 [C^*_t - C_{t-1}] \qquad (4.17)$$

Substituting C* from Equation 4.16 to 4.17:

$$C_t - C_{t-1} = \tau_3 [(\alpha_0 + \alpha_1 S_{t-2} + \alpha_2 S_{t-2} V_{t-2} + \alpha_3 AB_{t-1}) - C_{t-1}]$$

or rewritten for regression analysis as:

$$C_t = \tau_3 \alpha_0 + \tau_3\alpha_1 S_{t-2} + \tau_3\alpha_2 S_{t-2} V_{t-2} + \tau_3\alpha_3 AB_{t-1} + (1-\tau_3)C_{t-1} \quad (4.18)$$

The results of regression analysis are presented in Table 4.7

Table 4.7 Statistical Regression Results for Completion Model

| **Independent Variables** | **Eqn. 4.19** coef | t-stat |
|---|---|---|
| **Intercept** | 54,835 | (1.326) |
| **S** | 0.094 | (1.364) |
| **V*S** | -1.354 | (-2.475) |
| **AB** | 0.639 | (0.491) |
| **C** | 0.244 | (0.364) |
| **R sqr** | 0.757 | |
| **Observations** | 13 | |

Substituting the coefficients from regresision analysis, Equation 4.18 becomes:

$$C_t = 54835 + 0.094 S_{t-2} - 1.35 S_{t-2} V_{t-2} + 0.64 AB_{t-2} + 0.24 C_{t-1}$$ or

$$C_t - C_{t-1} = 0.76 [(72{,}151 + 0.12 S_{t-2} - 1.78 S_{t-2} V_{t-2} + 0.84 AB_{t-1}) - C_{t-1}] \quad (4.19)$$

The term within the parantheses ( ) is the long term desired completion C*. This model suggests a rapid adjustment of construction to changes in market conditions, that about 76% of the difference between the desired level and the undergoing actual construction would be made up. The two year lag shows that developers wasted no time to do construction right after permit had been issued. In a situation where absorption is low at 5%, the historical rate, there would be no desired long term completion when

vacancy rate reaches 17% of total stock. When the market was strong with vacancy rate as low as 1.0% and the corresponding absorption rate was 13%, then the desired long term completion was 23% of total stock. Such high rate of activity would easily create oversupply and increase vacancy rate.

There is a concern, however, that this model would work better in a market that has been established for quite a long time, as suppose to 14 years of observation in this analysis. The cycle of the market activities and changes would better be represented. This is important in real estate industry due to the nature of the gradual process of development that in developing countries like Indonesia, often involve uncertainties in obtaining permit, securing financing, clearing land.

## Chapter Conclusions

The models that have been analyzed this far demonstrate how rent determine absorption level, and then from the identity, how absorption determine the occupied stock and given the previous stock will determine vacancy rate. The vacancy rate along with current rent determine future rent levels. And finally, completion level can be estimated for the market given the stock level, the vacancy, and the estimated rent. Despite the limited data, the results can be considered good, in term of how well can the model explain the office market of Jakarta.

The space consumption per worker was found inelastic to rent, the drop of net rent of $1 would only add 0.04 $m^2$ of office space. However, since 0.04 $m^2$ does not mean much for an additional work space, then from the perspective of tenants, significant reduction in rent can be negotiated for just a slight increase in space per worker rented. It is therefore wise to 'bank' the space at this time when a firm consider to rent a space in a prime office or to negotiate a renewal. In Jakarta, 35% of tenants or about all existing tenants whose lease are expiring are considering of doing this.

The average target net rent in the Jakarta office market rises (or drops) about $0.72 per square meter if vacancy rate in the market drops (or rises) 1%. Future rent would drop 83% if current rent does not change. Well informed landlords and tenants would use this information when they go the bargaining table.

The office market in Jakarta seems to have a short cycle process and a high rate development activities to achieve the desired level of completion despite the increasing vacancy in the market. This may indicate a highly volatile market with speculative and risky investments which often can only be done by financially strong developers.

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# CHAPTER 5
# HEDONIC MODELS FOR JAKARTA OFFICE PROPERTIES

## Introduction

In this analysis, rents will be analyzed from cross-section data at the micro level, as suppose to macro economic analysis described in Chapter 4. Market rent is analzyed from the measures of the attributes of buildings in various locations or submarkets. This approach is usually used for analysis that is lacking of time series data, which actually can be considered as the case here.

The hedonic model to be used here is based on the approach described by Wheaton and Torto [1] and DiPasquale and Wheaton [2]. In reference 2 the hedonic models were applied to housing as well as office. One underlying concept of this approach is that the rent reflects the values placed on individual attributes. Several important issues addressed in that study on the attributes such as rent provisions will also be reviewed based on the situation in the Jakarta office market

Regression analyses will be used to the hedonic model to analyze the corelations between these attributes and rents. The analysis will emphasize on the use of hedonic model to describe the adjustment of rent to the market demand reflected in the changes of the model's attributes. The results of this analysis can be used to complement those from the macroeconomic analysis in the previous chapter.

## Organizing the Variables

Data on rents are part of leasing agreements. Just like in the U.S. these data are the proprietary of landlords and tenant and are not accessible to public. Concerns about losing competitive edge or the balance of power in the market are considered as the major

reasons of the reluctance to disclose the data. Data available or accessible to the public are usually the asking rents quoted by commercial brokerage firms. These data are usually provided for developers, investors, or prospective tenants.

The data collected for this thesis came from several sources. Rents listed in these data are average asking rents plus service charge. The service charge usually ranges from $6.50 to $8.00 and paid along with the rent payment terms [3]. There is no information, however, on the rent actually paid by each tenant when they signed a leasing agreement, because these data are not disclosable to public.

There are some inconsistencies of the data in their format,scope, and content originated from the different sources and create some problems in analyses. Some sources provide indications on rent provisions, although not in great detail, while the other did not. This may include information on the terms of rental payment, service or other charges to the rents that determine whether the rents are net or gross, and tenant improvement /fitout or free rent period. Some of the sources also provided asking rents from several years.

In order to make these data workable, the analysis is divided into three parts based on the completeness (or incompleteness) of the information. Each part has different scope of variables. Basically, the fewer the number of observations the more the number of variables. Thus, there are 82, 54, and 30 observation analyses where the 30 and 54 observations are the subsets of the 82 data. The data sets are presented in the Appendices.

In principle, the asking rents that landlords first offer are not the same with the rents that tenants are willing to pay or actually signed. However, since the rent data available are only asking rents, then it is assumed that the figures represent the rents that tenants eventually agreed or willing to pay. The level of rents that landlords would offer should consider the market conditions (see Chapter 4) and competition. Therefore, the offer should be within the 'striking distance' of the 'equilbrium' rent or the level that landlords would accept and what expected to be the tenants willingness to pay. It could

Table 5.1 Variables for Hedonic Models

| ACRONYM | |
|---|---|
| **YEAR** | Year of completion |
| **TERM** | Term of Lease |
| **SQM** | Total area of building in square meter |
| **HGHT** | Building height in number of floors |
| **FTYP** | Typical' Floor Area, calculated as SQM/HGHT |
| **PMT** | Term of Rent Payment |
| **FIT** | Fitout , 1 = with, 0 = without fitout |
| **PRKG** | Number of Parking |
| **PCHG** | Parking charge / fee per month ,<br>0 = free 2 = $21 - 40<br>1 = $1 - 20 3 = > $ 41 |
| **TEL** | Telephone Deposit (US$) |
| **TLX** | Telex deposit (US$) |
| **DLOCi** | Dummy variable for ith Location |
| 1 | SDM Sudirman |
| 2 | MHT MH Thamrin |
| 3 | HRS H Rasuna Said |
| 4 | GSB Gatot Subroto |
| 5 | SPR S Parman |
| 6 | GHK Gajah Mada / Hayam Wuruk |
| 7 | MMS Merdeka / Monas |
| 8 | OTH Other |

happen that the offer ends up to be the same as the agreed level. These rents would represent some kind of 'average consideration rent' per square meter as suggested in the Wheaton and Torto's paper which takes into account provisions on free rent period when applicable [4]. These rents also reflect the quality and type of product that the tenants demand or willing to accept and pay.

The list of the independent variables and the acronyms are listed in Table 5.1. The FTYP variable is derived from the other variables, in this case, FTYP = SQM / HGHT. Most of the independent variables are quite straight forward. The numbers represent the values of the variables.

Variables that are usually negotiable in leasing agreements are TERM, PMT, FIT, PCHG TEL, and TLX. Just like the rent data, these are the asking conditions, but will be

assumed that the figures reflect what the tenants accept and be willing to pay. Sometimes, charges for parking and communications are not negotiable and so are those for the basic fitout charges. The TERM and PMT variables reflect the commitment agreed by tenants on the length of the lease and the timing of payments.

As shown in Table 5.1 sets of number are assigned to variables PCHG, FIT, and LOC for different purposes. PCHG indicates the amount of parking fee charged to tenants to reserve a spot. Due to lack of information, for this analysis it would be assumed that the parking fee would also include the proportional shares of charges for guest parking. Then the total number of parking would represent both tenant's and visitor's parking. As shown in Table 5.1, a set of numbers is assigned for each range of parking fee.

FIT variable is a dummy variable for properties that represent concessions in the form of paid fitout or tenant improvement. Landlords usually provide some basic fitout services which is included in the basic rent or first deposit. Full packages of fitout may also be included in the rent provisions.

The location of the buildings in considerations are denoted with acronyms. The locations are shown on Figure 5.1. For the regression analysis, a set of numbers has also been assigned to each location. These numbers represent some kind of order. The 'golden triangle' area are considered as very highly prestigious [4]. Therefore, SDM, HRS, GSB, and also MHT locations are on top half of the list. SDM is considered as the most demanded area in Jakarta among the three. This is justified by the highest rent calculated by taking a simple average of rents of buildings in this area from the sample.

MHT and SDM form the main artery of Jakarta. Therefore, MHT is placed along with the golden triangle areas. GSB and SPR are located on the ring road (expressway) of Jakarta. This good accesibility and rapid development put SPR, the fringe area of the golden triangle, right next on the list.

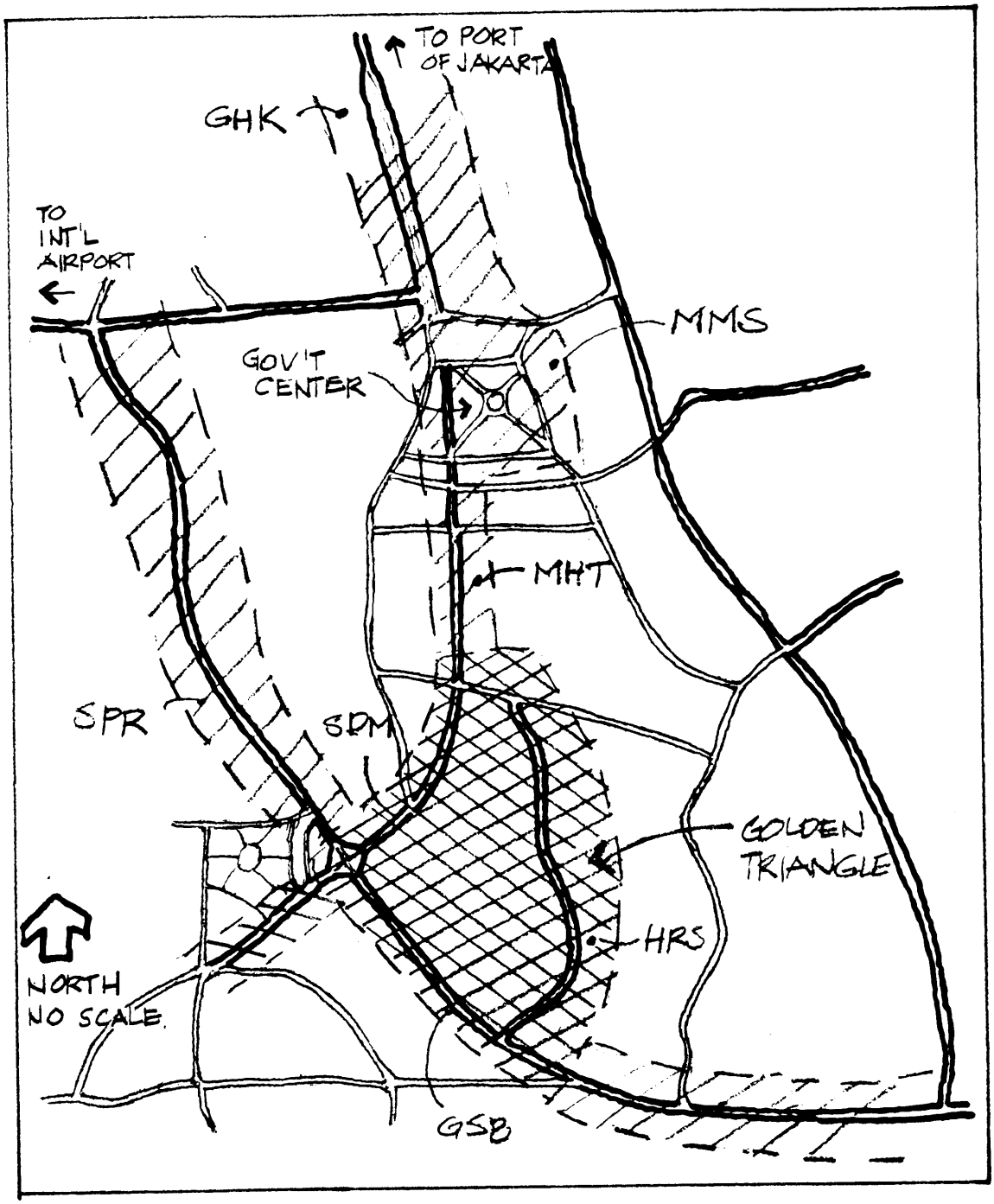


Figure 5.1 Property Locations for Hedonic Models

GHK and MMS are neighboring areas. GHK is located in the 'old CBD' (see Chapter 3). The area is a mix of prime and secondary offices and it is in a higher density zone with narrower streets, traffic and street parking problems like historical downtown areas in many cities around the world. While MMS area is located by the National Monument square and dominated by government buildings. This area appears to represents a civic center rather than a commercial area.

## Analysis of Hedonic Models

The regression analysis for the hedonic models requires dummy variables. The dummy variables here are generated for locations instead of YEARs, because YEAR here represents the year of completion of the building construction which is also assumed as the year the leases commenced. The dummy variables are denoted as $DLOC_i$ or dummy variable for i th location, where i is for the number assigned for submarket locations described in Table 5.1.

The hedonic models to be analyzed here use are in linear from instead of semi log suggested in Wheaton and Torto study. Then each variable has a direct effect to the rent. Moreover, location SDM or location 1 is set as the default in each model. The expected signs of the coefficients of the dummy variables would be negative, if the assumption of the rank of locational preference holds. This would be discussed later in the chapter when inferences of the regression results are made.

The 82, 54, 30 observation models are written as Equations 5.1, 5.2, and 5.3:

$$R = \alpha_0 + \alpha_1 YEAR + \alpha_2 FTYP + \alpha_3 HGHT + \beta_i DLOC_i \quad (5.1)$$

$$R = \alpha_0 + \alpha_1 YEAR + \alpha_2 TERM + \alpha_3 PMT + \alpha_4 HGHT + \alpha_5 SQM + \alpha_6 FIT + \alpha_7 PRKG + \alpha_8 TEL + \beta_i DLOC_i \quad (5.2)$$

$$R = \alpha_0 + \alpha_1 YEAR + \alpha_2 TERM + \alpha_3 PMT + \alpha_4 FTYP + \alpha_5 FIT + \alpha_6 PRKG + \alpha_7 PCHG + \alpha_8 TEL + \alpha_9 TLX + \beta_i DLOC_i \quad (5.3)$$

See Table 5.1 for the description of the variables in these models.

Table 5.2 Statistical Regression Results for Hedonic Model 5.1, 5.2, and 5.3

| EQUATION | 5.1 | | 5.2 | | 5.3 | |
|---|---|---|---|---|---|---|
| | COEF | t stat | COEF | t stat | COEF | t stat |
| **OBSERV.** | **82** | | **54** | | **30** | |
| **R SQR** | 0.335 | | 0.384 | | 0.641 | |
| INTERCEPT | -289.89 | (-2.573) | -492.21 | (-2.712) | -456.42 | (-1.373) |
| YEAR | 0.158 | (2.770) | 0.261 | (2.833) | 0.241 | (1.429) |
| FTYP | 0.00026 | (0.612) | | | 0.0016 | (1.255) |
| HGHT | 0.0078 | (0.167) | 0.0085 | (0.141) | | |
| TERM | | | -0.3754 | (-0.619) | -0.079 | (-0.088) |
| SQM | | | 0.000004 | (0.009) | | |
| PMT | | | -0.0398 | (-0.251) | -0.11 | (-0.445) |
| FIT | | | -0.5356 | (-0.712) | -2.197 | (-1.079) |
| PRKG | | | 0.0014 | (0.950) | -0.0026 | (-1.464) |
| PCHG | | | | | 1.1364 | (1.918) |
| TEL | | | -0.00102 | (-1.184) | 0.00028 | (0.207) |
| TLX | | | | | 0.00005 | (0.079) |
| DLOC2 | -0.634 | (-0.737) | 0.4275 | (0.341) | -2.197 | (-0.708) |
| DLOC3 | -2.067 | (-2.350) | -2.8356 | (-2.152) | -0.9885 | (-3.216) |
| DLOC4 | -3.572 | (-3.468) | -3.4527 | (-2.504) | -3.222 | (-1.037) |
| DLOC5 | -0.645 | (-0.539) | -0.0228 | (-0.008) | | |
| DLCO6 | -3.203 | (-2.480) | -5.1508 | (-2.676) | -2.771 | (-1.169) |
| DLCO7 | -3.003 | (-1.639) | | | | |
| DLOC8 | -6.074 | (-3.167) | | | | |

**Inferences of Regression**

As more variables involved, the R square values improve despite the decreasing number of observations. The coefficient of the variables that show the magnitude of the effects to rent, vary from the 82 to the 30 observations.

One important consideration in making inferences from these hedonic models is that the effect of the variables to the rent can be discussed from the perspective of both the landlords and the tenants. In general, landlords want to maximize the level of their rent reservation while, on the other hand, tenants always want to minimize their willingness to pay. Both sides would negotiate toward the common level on which their decisions can be optimized.

In the three models, rent increases as the value of YEAR, the building completion year, increases. This indicates that the younger or the newer the building, then the higher

the rent as expected. The coefficents vary between the models, although they are not much difference. For a new building, all else being equal, it would be rented for about $0.23 more than another building that was completed one year ago. The positive sign shows that firms are more willing to pay higher rent to occupy new buildings while landlords tend to charge more for newer buildings.

Term of the lease, TERM, in general has a negative effect to the rent. Thus the longer the term of the lease the lower the rent. The negative sign of this variable shows that tenants are only willing to pay lower rent for longer term. Tenants may anticipate a softening market and do not want to lock-in long term rental commitment, assuming constant rental payment within the lease term. Landlords may be willing to accept lower rent for longer term to have the prospective tenant sign the agreement as long as the level of rent is still profitable within the lease term. In both cases, the negative sign shows the anticipation by both landlords and tenants on the softening of the market.

Building heights, HGHT, although positive in effect, but very small in magnitude. This shows that landlords tend to increase rent if the buildings are taller, according to the result. Some may argue that by having more space (in a taller building) enable landlord to lower the rent slightly, but another argument might say that operational costs or expenses are more expensive for taller buildings. The small coefficient of the variable, consistent in two of the models, can also be interpreted that there is only small rent premiums for landlord for having a taller building. While the tenants are not willing to pay too much more for occupying a taller building.

Multi-story buildings are not entirely new in Jakarta, especially medium rise building. But 14 or more story buildings were first built in the late 60's and the first high rise commercial office building with 25 or more stories was built in 1972. There is no indication that firms do not want to occupy office space at higher levels in high rise buildings because the firms' workers are not used to it. Such problems occur in residential buildings when affordable apartments were introduced in the early 80s and units on upper

levels were vacant for quite a while. There may also be concerns about fires and earthquakes that may make firms to decide not to lease upper spaces, although this is not clear. There is a preference, however, especially for firms like banks and travel agents, to occupy ground floor either for accessibility, convenience, prestige, or may be because of building amenities. Rents for spaces at ground and mezzanines are usually higher than for other units on upper levels.

Since the available data for each tenant were neither adequately detailed nor complete, particularly information on the floor level a tenant occupy, then such variable were not incorporated in the analysis. Thus, basically what the results suggest is that only a small premium considered by landlords for tall buildings, while from the tenant point of view, firms may not be willing to pay to much more for an office space just because it is in a taller building. The higher rent estimated from the model for a building that is 1 story taller than another may be to cover higher basic operating cost for a bigger mass of building. This small increase in rents with everything else being equal may be needed by landlords to keep the rent low enough that it would not to overturn tenant decision on this particular variable of building feature.

The FTYP variable represents the area of an average 'typical' floor calculated by dividing the total area by the number of floors. This may not be an exact representation of either office floor or footprint. Architecturally, office buildings are oftened designed to have a 'podium' levels and a tower block attached or on top of the 'podium'. Despite this argument, this variable gives a rough idea of the average floor area of the building. For prospective tenants, especially large firms that may require large and contiguous space, this variable may become an important consideration.

FTYP, in general, did not have a significant effects to the rent, despite the positive sign. Landlords may actually like to think that firms like to have contiguous space and willing to pay more for that. But the coefficients were low that if the typical floor area increases by an increment of 100 square meter, then from the models rent is estimated to

increase between 3 to 20 cents dollar, if all other variables remain the same. Nevertheless, this is consistent with the notion that firms like to occupy larger floor area with a configuration that can accomodate contiguous expansion for possible future company growth. The problem for landlords now, these firms are not willing to pay a lot extra for such space.

SQM, the total floor area variable, has the smallest coeffient. The contribution of this variable to the rent is also small. The average total floor area of buildings from the sample is 22,600 square meters. Thus its contribution to the rent, estimated from the model is just under $0.01. While the largest building in the sample, has a total floor area of 93,500 square meters. Then its effect to the rent is about $0.05, which is not significant, if all else being equal. This is actually also consistent with the HGHT and the FTYP effects analyzed above.

The terms of payment is denoted as PMT. This ranges from 1 to 12, or from annual payment, usually made 1 year in advance, to monthly payments. The effect is negative to the rent, which means rents with annual payment is greater than those with monthly payments. This may be explained differently from the perspective of both sides. For landlords, having the rent paid in advance give them a hedge against the risks of tenants' default, but they may suffer from another kind of risks: the foreign exchange risks. Rents and even some other service charges in Jakarta are quoted in US dollar, may be due to the fact that Indonesian currency, Rupiah, is very weak. Rupiah had suffered three major devaluations of 28 - 34% in 1978, 1983, and 1986 and continue to weaken gradually [6]. In order to compensate and hedge against the exchange risks then landlords may have to have higher rent for annual payment lease. The models show that, if all other variables are being equal, the difference between monthly and annual payments ranges between $ .44 to 1.21. If the average rent (base rents plus service charges) is $ 22, then this difference would provide landlords 2.0 to 5.5 % compensation against the monthly average of about 2 % currency devaluation in 1991 and 1992. The same reason of foreign

exchange hedging may make tenants more willing to pay higher for annual payment to lock-in payments with current lower exchange rate.

Deposits for communication lines include telephone, TEL, and telex, TLX. The deposit for telephone is a necessity for firms, but telex service is usually optional. The deposit for telephone averages about $1,450 per month, while telex service, for buildings providing it, averages about $2,100 per month. Thus, on the average, the two variables contribute as much as $ 0.44 and $ 0.11 to the rent. These amounts are required by the landlords and agreed to pay by tenants. Telephone services are usually measured by the ratio of the number of lines available per tenants.

PRKG and PCHG are the variables that represent the number of parking and parking charges per month. Parking spaces, especially those available to be reserved, are expected to be highly desirable [7] and therefore is expected to have positive effect to the rent. The results show that this was true for the 54 observation analysis, but the reverse for the 30 observation.

The negative coefficient of PRKG in the 30 observation model, indicates that rents are lower for buildings with more parking stalls. This seems to contradict the expectation of high demand of parking. In order to explain this, the PCHG, which has positive coeffient, will also be taken into account.

From this sample, the average number of parking in a property is 491 stalls, and the average parking charge is $33, or category 2 charge in the model. If these figures are applied to the model, the number of parking will reduce rent by 491*0.00264 = $1.30, while the parking charge will increase the rent by 2*1.136 = $2.27, all else are being equal. The net effects of both is a positive 0.97. Since office buildings with parking facilities are expected in high demand, then what this suggests is that landlords may be willing to reduce rent to attract prospective tenants, but compensate this with parking charge, which in combination yield in positive effect to the rent. Since this model is using 1992 data, and from the macro economic analysis in previous chapter the vacancy rate is in a double

digits, this could be one strategy for landlords to have competitive edge by reducing rent and providing adequate number of parking spaces. If parking was really in high demand as expected and tenants are supposedly willing to pay for that, then this argument is consistent with the expectation, and landlords can benefit from that. As a matter of fact, the number of parking space can increase as many as 0.97 / 0.00264 or about 360 additional stalls without raising the parking charge (without shifting from range 2 to 3).

The fact that the analyses of 30 and 54 observation gave two different results for PRKG cannot really be explained other than that the sample size may just be too small that sometimes inconsistency like this may occur.

The FIT variables included in two models reduces the rents in both cases. FIT is part of concession offered by landlords. The competition among landlords may force them to offer certain package of fitout, normally covers some basic works when new tenants moving in plus other fitout works at negotiable scopes. As each tenant may have different space requirements, then the standard fitout provided by landlords may not be benefial to them. Firms would like to customize the fitout and therefore may look at rent with fitout package as somewhat redundant if they would end up paying some extra for their own customized one. Therefore, tenants are willing to pay fitout only at lower rent.

The effects of the LOC, location variables, to the rents are very interesting. As described earlier in the chapter, each location has been assigned a number and location 1 (SDM), considered as the most prestigious location with the highest average rent among the others, has been set as the default. Thus, the other locations are expected to have negative coefficients and therefore, negative effects to the rents.

Since these are dummy variables, each variable will affect the rent separately and there will be no incremental effects like the other non dummy variables. The changes of the rents will be determined by the coefficient of the dummy variable of the location under consideration. If the other variables are kept the same, then the models will show how rents change at different locations.

The regression analyses of the three models gave different results. In terms of the sign of the coefficients, the 82 observation test that include all locations has all the expected negative signs. The 30 observation also has the same result, but the test only involved 4 locations plus default. While the result of the 54 observation analysis showed one location with positive sign for the coefficients indicating the locations' 'superiority' over the default of location 1. Locations 2, 3, 4, and 6 are those always appear in the three models.

The 30 observation model has more variety of variables despite considering only 5 locations (default, 2, 3, 4, and 6). As expected, the four location variables have negative coefficients, thus it justifies SDM as the area where rents are the highest, given all other variables constant. The GHK location, however, outrank GSB and HRS, two of the goldent triangles, in terms of rents.

Parking could be one reason to put properties in GHK areas over GSB and HRS in this model. The addition of three prime offices averaging over 1000 parking spaces clearly outnumber the parking facility in other areas. Probably this is one way for building owners to compete with properties in the golden triangle area. If this result is referred to previous argument about net effect of parking and parking charges, then developers or property owners can capitalize from the development strategy of providing more parking spaces. GHK area also has certain advantage in location as the development of SPR start to link the old CBD and the SDM area. Good acces to the Jakarta International Airport makes this area more appealing for future development.

In this model, in general, the effects of parking especially from PCHG appear to be quite pronounced to the rents of properties in different location. As a matter of fact the PCHG variable is used only in this 30 observation model.

In addition, there seem to be several reasons that put GSB ahead of HRS. The improvement of the expressway that link the district to an industrial area in East of Jakarta could be one reason. If the presumption of parking demand holds, then firms may prefer

GSB over HRS because the average number of parking spaces in buildings in GSB area is greater than that of HRS.

The 30 observation model also shows that the decision about the rents by both landlords and willingness to pay by tenants vary when more variables involved. When information about amenities such as parking, concessions, and tenant services such as telex, do not become a concern or not immediately available, then the effects of locations on rents are given in the 82 observation model. Here, rents for properties in SPR area are estimated higher that those in MHT and in HRS and GSB, two of the golden triangle locations. Different results are also shown in the 54 observation model.

## Application of Hedonic Models

The models discussed above can be used as a quick way to estimate rent if the values of the other variables can be determined either by comparing with certain market values, or by maximizing against certain constraints such as FAR and parking ratio, or by setting certain targets such as return on investments. Alternatively, when certain target rent or prevailing market rent has been set, the values of a particular variable can also be estimated.

For illustration purposes, the rent variations across locations will be analyzed in the following. Suppose a building plan to develop a building in Jakarta. The building is scheduled to complete and start to operate in 1995 with the average lease term of 3 years and 4 rent payments per year. For the other variables the values will be determined by taking average values from the sample.

The average values from different samples vary. Therefore, if a developer has an idea of location and just wants to see the other properties in the same area, then the average of that particular area will be taken from the sample. But if the measures for the whole market will be considered, then the overall average from the sample will be used

instead. Table 5.3 through 5.5 shows the average values of the variables derived from each sample and the rents estimated from the corresponding models, as well as the simple average of the market rents. The rent values estimated in the tables above can also be represented graphically in Figure 5.2 through 5.4.

In the tables, the average market rents are represented under category 1, while 2 represents rents calculated based on the average values of the variables for each location in the sample. Thus, for example, the value used for parking in GSB location is the average

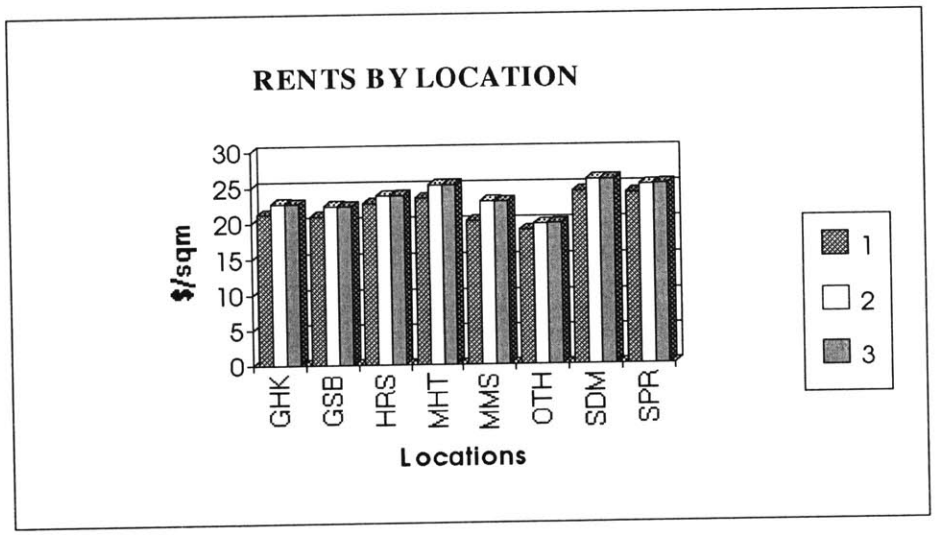


Figure 5.2 Rents by locations, 82 Observation Model.

Table 5.3 Rents by Location, 82 Observation Model

| LOC | COEFF | HGHT | SQM | RENT 1 | RENT 2 | RENT 3 |
|---|---|---|---|---|---|---|
| GHK | -3.203 | 22 | 31750 | 21.25 | 22.72 | 22.67 |
| GSB | -3.572 | 14 | 23494 | 20.94 | 22.36 | 22.30 |
| HRS | -2.0666 | 11 | 15306 | 22.73 | 23.76 | 23.81 |
| MHT | -0.634 | 21 | 26929 | 23.38 | 25.23 | 25.24 |
| MMS | -3.0034 | 13 | 21750 | 20.21 | 22.92 | 22.87 |
| OTH | -6.074 | 7 | 9837 | 18.88 | 19.72 | 19.80 |
| SDM | 0 | 21 | 28397 | 24.26 | 25.89 | 25.87 |
| SPR | -0.645 | 12 | 13357 | 24 | 25.10 | 25.23 |
| SAMPLE | | 16 | 22817 | 23.33 | | |

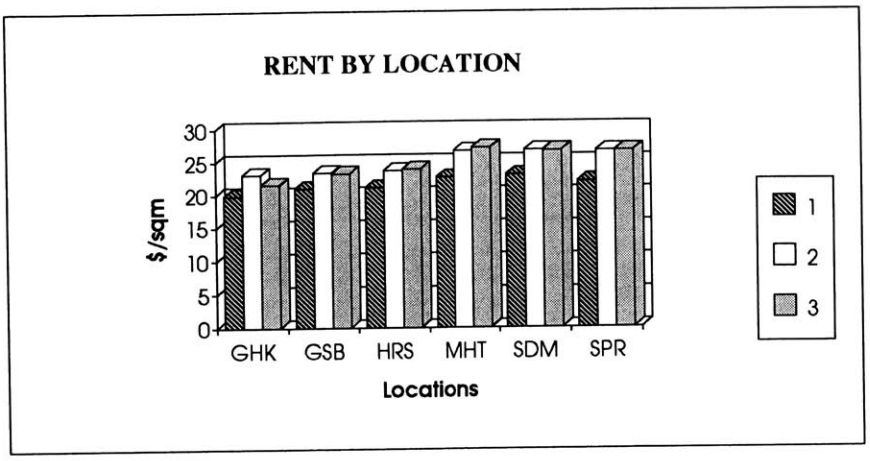


Figure 5.3 Rents by Location, 54 Observation Model

Table 5.4 Rents by Location, 54 Observation Model

| AVERAGE VALUES LOC | COEFF | HGHT | SQM | PRKG | TEL | RENT | RENT 1 | RENT 2 | RENT 3 |
|---|---|---|---|---|---|---|---|---|---|
| GHK | -5.151 | 21 | 30000 | 1300 | 1068 | 19.83 | 21 | 23.13 | 21.56 |
| GSB | -3.453 | 15 | 21715 | 473 | 1264 | 21 | 21.1 | 23.37 | 23.26 |
| HRS | -2.836 | 9 | 12302 | 314 | 1248 | 21.1 | 22.61 | 23.71 | 23.88 |
| MHT | 0.428 | 24 | 26809 | 347 | 1768 | 22.61 | 23 | 26.66 | 27.14 |
| SDM | 0 | 20 | 26304 | 577 | 1566 | 23 | 22 | 26.73 | 26.71 |
| SPR | -0.023 | 8 | 10500 | 150 | 900 | 22 | 22.22 | 26.63 | 26.69 |
| SAMPLE | | 17 | 22487 | 507 | 1448 | 22.22 | | | |

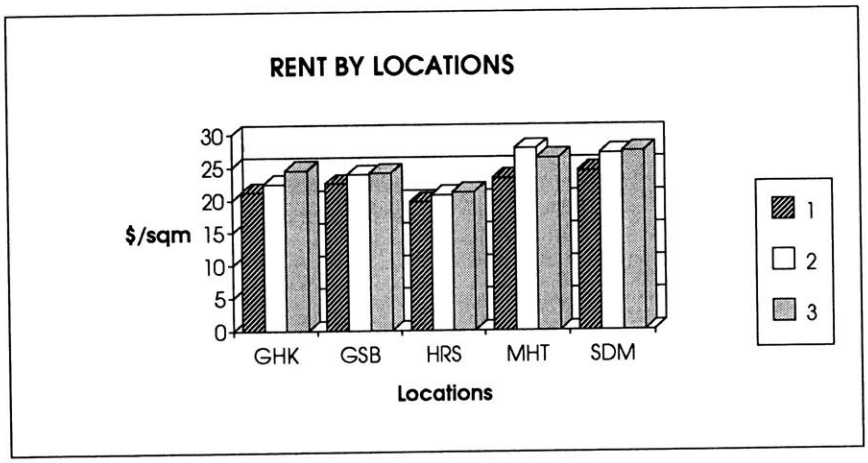


Figure 5.4 Rents by Location, 30 Observation

Table 5.5 Rents by Location, 30 Observation

| AVERAGE VALUES LOC | COEFF | HGHT | SQM | PRKG | PCHG | TEL | TLX | RENT | RENT 1 | RENT 2 | RENT 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GHK | -2.771 | 21 | 33000 | 940 | 1 | 863 | 740 | 21.21 | 22.43 | 24.53 | |
| GSB | -3.222 | 23 | 20075 | 368 | 2 | 1850 | 2465 | 22.5 | 23.87 | 24.08 | |
| HRS | -6.205 | 20 | 10221 | 194 | 2 | 1584 | 2250 | 19.65 | 20.67 | 21.10 | |
| MHT | -0.988 | 23 | 27332 | 366 | 3 | 1878 | 1644 | 23.22 | 27.71 | 26.32 | |
| SDM | 0 | 24 | 26797 | 530 | 2 | 1584 | 2128 | 24.35 | 26.96 | 27.30 | |
| SAMPLE | | 20 | 25418 | 491 | 2 | 1593 | 1978 | 23.42 | | | |

number of parking in that particular location taken from the sample considered in the model. The rent values under category 3 are calculated based on the average market values of the sample.

The range of rent values estimated from these models is $19.80 to $27.30. The market net rent obtained from brokerage firms' report for 1995 was $13 plus the average service charge of $7.25 made the gross rent of $20.25. This value falls within the range of the rents estimated using the hedonic model.

These models can also be used to estimate the value of certain variable given the strategy of the developers not to exceed or to maintain at the level of average market rent. Questions such as the optimum number of parking space in certain location, can be solved given the average market values of rents and parking charges.

## Chapter Conclusions

This chapter shows hedonic model as a product model to measure the movement of rents due to the adjustment of the attributes considered in the model to the market demand. Thus the rents estimated by this approach reflect the overall character of what people demands are and how much they are willing to pay for them. Because the model is used at micro level dealing with issues negotiated in leasing agreements, then the model can also be used as a measure of how landlords and tenants can optimized their decisions.

The model may also be used to support investment decisions. The considerations in the selection of locations, design features, and leasing strategy can be simulated with financial targets and constraints on the other side to reach optimum decisions for the investment.

The analysis confirms that the rent estimated in the hedonic models is higher for newer buildings as expected. Tenants are willing to pay more to occupy these buildings. However, tenants do not seem to see the building scale as a good reason to pay too much

extra for rent. They are reluctant to do so for taller building and certainly do not really appreciate buildings with large total floor area. Even spaces that offer contiguous expansion for future growth do not seem to appeal to these firms. The firms agree to pay more for these features anyway, but not too much or only very little more.

A shorter period of lease term and an advance annual payment are preferred by landlord and agreed by tenants. The anticipation of soft market has made tenants to demand lower rent for longer term of lease. Apparently, tenants try to avoid or minimize the potential loss due to the drop in rents during the term of the lease. In the meantime, the weakness of Indonesian currency and the fact that rents are quoted in US dollars would encourage tenants to demand annual payment over the other payment terms, provided that they can come up the amount of money at the beginning of the lease term. By using this strategy, tenants can hedge themselves against the foreign exchange risks.

Amenities such as parking and services such as telephone and telex are important considerations in rents since they practically become necessities in the firms' operation. Tenants are willing to pay an additional $0.58 to the rent for these services and even $1 more to the rent for parking space and its fee/charge.

If prestige is on the highest priority for a firm, then the firm should rent its office at SDM location as this location is proven, in general, to have the highest rent and to be in high demand. If rental expenses of a firm becomes a major concern, but at the same time the firm want a prestigious location with good parking and communication services, then GSB location could become a good choice. It is one of the golden triangle, located right on the expressway, better parking than HRS, and more important, lower rent.

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CHAPTER 6

# FORECAST AND FUTURE OUTLOOK OF JAKARTA OFFICE MARKET

## Introduction

The models developed and analyzed in chapter 4 are the basis to make forecasts in this chapter. Forecasts are made based on the demand and supply conditions. In office market, space demand is determined by the growth of office employment. Therefore, the first few sections of this chapter will start with the forecast of office employment. Given the forecasted office employment, the model simultaneously forecasts absorption, rent, and completion in the market.

The sections following the forecast analysis will discuss the general expectation or the future especially the outlook of investment in office properties in the Jakarta real estate market. These sections will briefly discuss some new and unconventional approaches in office or real estate market in general, in Jakarta.

## Forecasting Office Employment

These forecasting models require inputs of current and historical market conditions that are usually obtained from sources such as brokerage firms. These inputs include vacancy rates, total stock of office space, and also market rents. But the whole models actually starts with the main determinant of demand of office space: office employment. Since office employment is derived from employment data (see Chapter 4), then the forecast of office market should start with the forecast of employment in Jakarta.

Employment in a region is expected to move along with the growth of the region's economy. Predicting the economy, however, is beyond the scope of this thesis. For the

purpose of the analysis for office employment forecast, the growth of real GDP is the economic indicator that will be used. The GDP to be used is the national GDP because of several reasons. First, as previously mentioned, Jakarta as the capital of Indonesia is the economic indicator of the country as well. Its economy is expected to move with that of the nation. Table 2.2 shows that the GRDP of Jakarta has been quite consistent in term of its percentage of the national GDP. The second reason is that the data are simply more available in national scale, not only from local or national, but also from international sources. Institutions such as World Bank and Asian Development Bank even have projection of GDP for several years to come. Therefore, it would be fair to use the national GDP data to forecast the employment.

Table 6.1 and Figure 6.1 shows the growths of employment and real GDP, as well as 4 year forecasts from 1992. There will be two scenarios of forecast that represent low (pessimistic) and high (optimistic) growths. Data obtained from several sources are compared as a starting point. The data from World Bank seems to fit to the pessimistic category. The optimistic forecast data until 1994 are obtained from the Economist Intelligence Unit (EIU) Country Report. Some assumptions will be taken for the forecasts beyond 1994.

Figure 6.1 suggests that the rates of high economic growth are between 7 to 11%. At least there was 1 period of high peak occurred within the Five Year Development Plan of the government. Indonesia now is in the fifth plan which started in 1989. The economy is slowing down in term of economic growth. From figure 6.1 the graph seems to flatten to indicate stabilized rates. But the hard efforts of the government to increase gains in non-oil exports would be optimistically predicted to result in rebound of the growth rate, although it might not be as high as the rate in 1987. The average of high peak rates from previous years will be used as the peak rate of the forecast as shown in Table 6.1. After this, the rate would be predicted to slow down and stabilized as shown in Figure 6.1.

Table 6.1 GDP Forecasts

| YEAR | PESM [1] (%) | OPTM (%) |
|---|---|---|
| 1992 | 5.8[2] | 5.8[2] |
| 1993 | 5.2 | 5.9[3] |
| 1994 | 5.2 | 6.6[4] |
| 1995 | 5.7 | 8.8[5] |
| 1996 | 5.7 | 8.2[5] |

Source: 1) World Bank Report 7758 - IND
2) Official Estimates
3) Economist Intelligence Unit
4) Balance of Payment Basis, EIU Estimate
5) Estimates

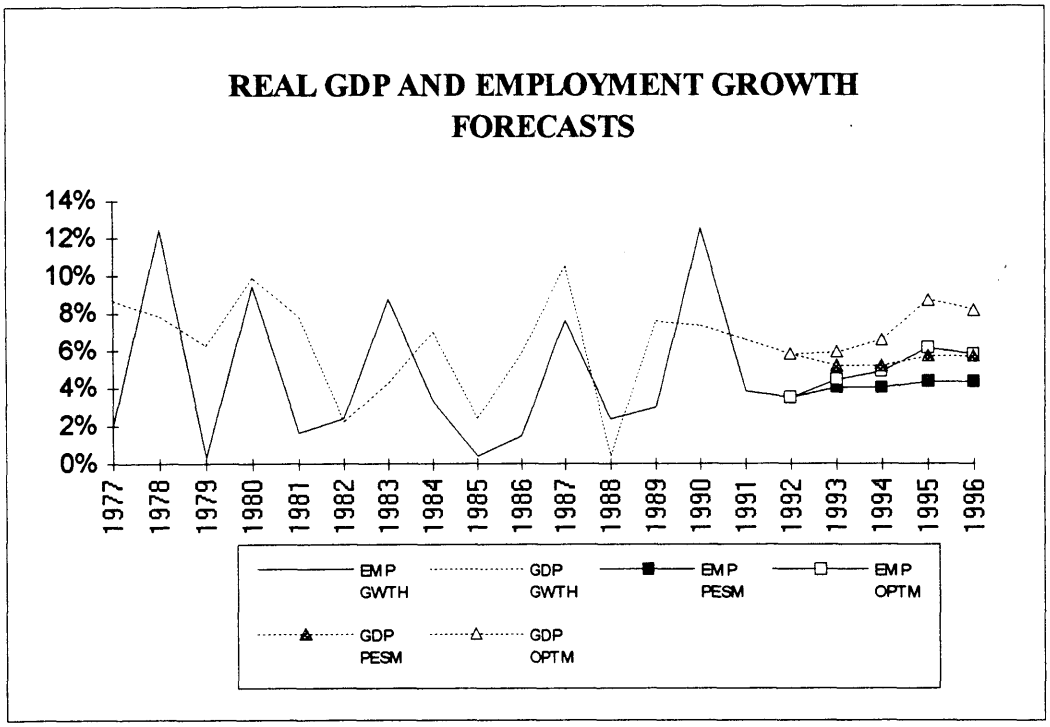


Figure 6.1 Forecasts of Growth of Employment and Real GDP
Source: Derived from International Monetary Funds, The ASEAN Secretariat, Jakarta Statistical Office, and Central Bureau of Statistics.

In order to forecast office employment, the correlation between GDP and employment growth would be analyzed. A linear correlation is assumed to simplify the process. By using the pessimistic and optimistic growth rates of GDP, predicted by analysts, the pessimistic and optimistic growth rates of employment can be projected from the correlation.

The level of total office employment is the sum of the office employment in each industrial sector derived from the corresponding sector of total employment based on the method described in chapter 4. Ideally the growth of total office employment is also forecasted from its aggregate industrial sector growths. However, such detailed data at city level for Jakarta do not exist. Therefore, the growth of total office employment will be forecasted based on the forecast of total employment. From table 4.3, it seems that office employment for the last 7 years accounted for about 14% total employment. This ratio will be assumed to forecast office employment from total employment.

## Forecasting Office Market Determinants

The forecast of absorption level is based on equations 4.9 and 4.10. Given the 1992 data of the variables, absorption levels for 1993 and the subsequent years can be directly forecasted by using equation 4.9.

Equation 4.10 requires rent ($R_t$), occupancy level ($OC_{t-1}$), and office employment ($OE_{t-1}$) inputs. The rent can be estimated from the rent - vacancy adjustment model represented in equation 4.15, given the vacancy rate and rent in 1992 ($V_{t-1}$ and $R_{t-1}$ ). Occupancy rate, $OC_{t-1}$ , is derived from the accounting identity. Given the office employment data and forecast, then absorption level in 1993 can be forecasted from equation 4.10.

For absorption level in the subsequent year, vacancy rate in the next period ($V_t$) is required. This rate can be calculated from identity 4.2 involving total stock and occupied space of the same year. The total stock level for that year ($S_t$) is determined in identity 4.1 by the sum of the completion level at the same year and total stock from previous year, assuming negligible scrappage rate. Completion level ($C_t$)can be estimated from equation 4.19 using lagged data that have been calculated or known. As occupied space $OC_t$ can be calculated from the identity 4.3, and given the new total stock, $S_t$, at that year that incorporate the new supply of office space, $C_t$ , then vacancy rate, $V_t$, can be estimated.

The whole process continues and forecasts can be made for absorption, vacancy rate, and completion of office space in the market.

The complete picture of the forecast will consist of equations 4.10, 4.15, 4.19, and the identities. There will be pessimistic and optimistic scenarios that correspond to the pessimistic and optimistic GDP and employment forecasts.

In the discussion about supply analysis in chapter 4, some concerns had been mentioned about the short period of data that may not reflect the 'true' cycle of the development activities in the market. For comparison purposes, the pessimistic and optimistic forecasts will also be made using the completion data from brokerage firms. These data include confirmed future supply of office space and probably also some estimate of completion.

The whole sets of forecast calculations will be presented in tables 6.2 through 6.5. Figures 6.2 through 6.5. Figure 6.2 shows the pessimistic and optimistic forecasts for office employment and absorption projections, while figure 6.3 shows the same except the data from brokerage firms are used for the levels of completion. The forecasts of vacancy rate and completion level are exhibited in figure 6.4 showing pessimistic and optimistic scenarios, and in figure 6.5 using brokers' estimates.

Figure 6.2 shows that historically, lagged absorption occurred. The rapid office employment growths in 1983 and 1990 were absorbed two years later. Figure 6.4 shows that in 1983 completion actually reacted promptly in a rapid rate and extensively in term of total addition of new space. As the result, even though absorption was high, in 1985, the high activity in development created an oversupply or high vacancy rate.

Similar situation occurred in the next boom period. In this period, developers even anticipated the rapid employment growth and started construction activities. By the time the absorption level reached its peak, the vacancy rate was high and construction activities was declining.

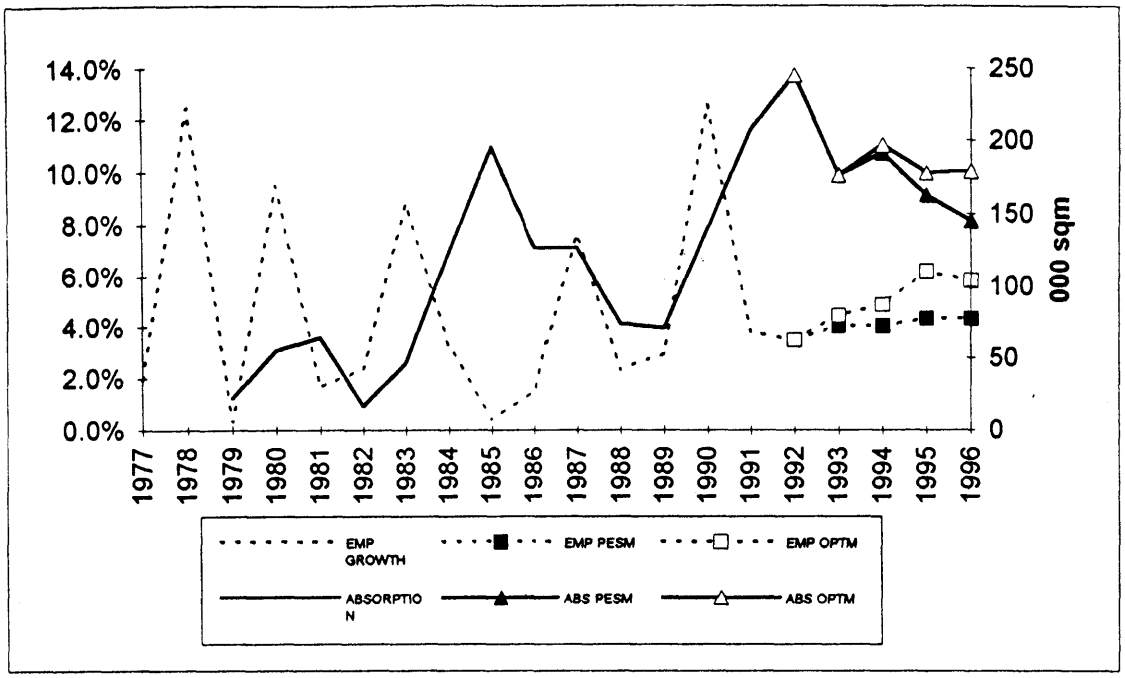


Figure 6.2 Pessimistic and Optimistic Forecasts of Absorption and Employment Growth

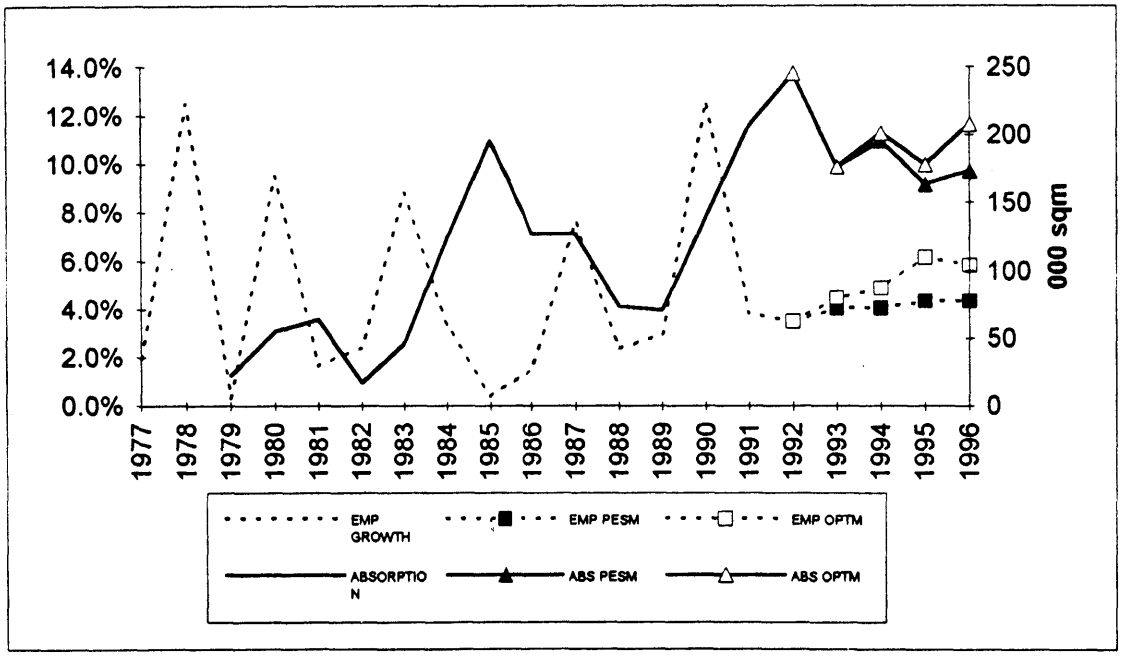


Figure 6.3 Pessimistic and Optimistic Forecasts of Absorption and Employment Growth using Brokerage Firms' Estimates

Table 6.2 Pessimistic Forecast, Model

**ABt = -585090 + 3.275 OEt-1 - 0.014 (Rt*OEt-1) - 0.35 OCt-1**

**Rt = 17.91 -59.78Vt-1 +0.17Rt-1**

**Ct = 54835 + 0.094 St-2 -1.354 St-2 Vt-2 + 0.639 ABt-1 + 0.24 Ct-1**

| YEAR | EMP GWTH | TOTAL EMP | OFF EMP | TOTAL STOCK sqm | VAC RATE | RENT 1992 $ | OCCPD SPACE sqm | ABS sqm | YEARLY SUPPLY sqm | VAC SPACE sqm |
|---|---|---|---|---|---|---|---|---|---|---|
| 1975 | | | | 103,525 | | | | | 40,000 | |
| 1976 | | 1,533,586 | 189,490 | 168,525 | | | | | 65,000 | |
| 1977 | 2.0% | 1,563,608 | 194,297 | 196,825 | | | | | 28,300 | |
| 1978 | 12.4% | 1,758,218 | 214,778 | 200,425 | 20.0% | 11.46 | 160,340 | | 3,600 | 40,085 |
| 1979 | 0.3% | 1,764,038 | 222,917 | 200,425 | 9.0% | 11.88 | 182,387 | 22,047 | 0 | 18,038 |
| 1980 | 9.5% | 1,931,114 | 244,030 | 247,425 | 4.1% | 11.74 | 237,404 | 55,018 | 47,000 | 10,021 |
| 1981 | 1.7% | 1,963,218 | 248,087 | 307,425 | 2.0% | 13.05 | 301,277 | 63,872 | 60,000 | 6,149 |
| 1982 | 2.4% | 2,010,321 | 249,046 | 333,805 | 4.7% | 16.59 | 318,006 | 16,730 | 26,380 | 15,799 |
| 1983 | 8.8% | 2,186,965 | 265,497 | 411,366 | 11.5% | 25.17 | 364,167 | 46,161 | 77,561 | 47,199 |
| 1984 | 3.3% | 2,259,508 | 282,391 | 584,720 | 16.6% | 13.25 | 487,503 | 123,336 | 173,354 | 97,217 |
| 1985 | 0.4% | 2,268,747 | 291,666 | 829,920 | 17.7% | 9.47 | 682,965 | 195,462 | 245,200 | 146,955 |
| 1986 | 1.5% | 2,302,527 | 312,123 | 974,056 | 16.8% | 9.13 | 810,183 | 127,218 | 144,136 | 163,873 |
| 1987 | 7.6% | 2,477,648 | 341,816 | 1,038,546 | 9.8% | 7.21 | 937,086 | 126,903 | 64,490 | 101,460 |
| 1988 | 2.4% | 2,536,056 | 351,256 | 1,048,096 | 3.5% | 14.00 | 1,011,087 | 74,001 | 9,550 | 37,009 |
| 1989 | 3.0% | 2,611,412 | 361,043 | 1,092,956 | 1.0% | 17.06 | 1,081,522 | 70,435 | 44,860 | 11,434 |
| 1990 | 12.5% | 2,938,549 | 407,113 | 1,240,623 | 1.6% | 25.75 | 1,221,148 | 139,626 | 147,667 | 19,475 |
| 1991 | 3.8% | 3,051,133 | 426,102 | 1,593,439 | 10.4% | 19.33 | 1,428,105 | 206,957 | 352,816 | 165,334 |
| 1992 | 3.5% | 3,157,806 | 436,026 | 1,894,039 | 11.7% | 14.00 | 1,673,105 | 245,000 | 300,600 | 220,934 |
| 1993 | 4.0% | 3,285,438 | 459,961 | 2,104,696 | 12.1% | 13.32 | 1,849,124 | 176,019 | 210,657 | 255,573 |
| 1994 | 4.0% | 3,418,229 | 478,552 | 2,202,303 | 7.4% | 12.91 | 2,040,050 | 190,926 | 97,606 | 162,253 |
| 1995 | 4.3% | 3,566,581 | 499,321 | 2,254,751 | 2.3% | 15.70 | 2,203,006 | 162,956 | 52,449 | 51,745 |
| 1996 | 4.3% | 3,721,372 | 520,992 | 2,413,838 | 2.7% | 19.21 | 2,347,873 | 144,867 | 159,087 | 65,966 |

Boxed area is forecast

Table 6.3 Optimistic Forecast, Model

**ABt = -585090 + 3.275 OEt-1 - 0.014 (Rt*OEt-1) - 0.35 OCt-1**

**Rt = 17.91 -59.78Vt-1 +0.17Rt-1**

**Ct = 54835 + 0.094 St-2 -1.354 St-2 Vt-2 + 0.639 ABt-1 + 0.24 Ct-1**

| YEAR | EMP GWTH | TOTAL EMP | OFF EMP | TOTAL STOCK sqm | VAC RATE | RENT 1992 $ | OCCPD SPACE sqm | ABS sqm | YEARLY SUPPLY sqm | VAC SPACE sqm |
|---|---|---|---|---|---|---|---|---|---|---|
| 1975 | | | | 103,525 | | | | | 40,000 | |
| 1976 | | 1,533,586 | 189,490 | 168,525 | | | | | 65,000 | |
| 1977 | 2.0% | 1,563,608 | 194,297 | 196,825 | | | | | 28,300 | |
| 1978 | 12.4% | 1,758,218 | 214,778 | 200,425 | 20.0% | 11.46 | 160,340 | | 3,600 | 40,085 |
| 1979 | 0.3% | 1,764,038 | 222,917 | 200,425 | 9.0% | 11.88 | 182,387 | 22,047 | 0 | 18,038 |
| 1980 | 9.5% | 1,931,114 | 244,030 | 247,425 | 4.1% | 11.74 | 237,404 | 55,018 | 47,000 | 10,021 |
| 1981 | 1.7% | 1,963,218 | 248,087 | 307,425 | 2.0% | 13.05 | 301,277 | 63,872 | 60,000 | 6,149 |
| 1982 | 2.4% | 2,010,321 | 249,046 | 333,805 | 4.7% | 16.59 | 318,006 | 16,730 | 26,380 | 15,799 |
| 1983 | 8.8% | 2,186,965 | 265,497 | 411,366 | 11.5% | 25.17 | 364,167 | 46,161 | 77,561 | 47,199 |
| 1984 | 3.3% | 2,259,508 | 282,391 | 584,720 | 16.6% | 13.25 | 487,503 | 123,336 | 173,354 | 97,217 |
| 1985 | 0.4% | 2,268,747 | 291,666 | 829,920 | 17.7% | 9.47 | 682,965 | 195,462 | 245,200 | 146,955 |
| 1986 | 1.5% | 2,302,527 | 312,123 | 974,056 | 16.8% | 9.13 | 810,183 | 127,218 | 144,136 | 163,873 |
| 1987 | 7.6% | 2,477,648 | 341,816 | 1,038,546 | 9.8% | 7.21 | 937,086 | 126,903 | 64,490 | 101,460 |
| 1988 | 2.4% | 2,536,056 | 351,256 | 1,048,096 | 3.5% | 14.00 | 1,011,087 | 74,001 | 9,550 | 37,009 |
| 1989 | 3.0% | 2,611,412 | 361,043 | 1,092,956 | 1.0% | 17.06 | 1,081,522 | 70,435 | 44,860 | 11,434 |
| 1990 | 12.5% | 2,938,549 | 407,113 | 1,240,623 | 1.6% | 25.75 | 1,221,148 | 139,626 | 147,667 | 19,475 |
| 1991 | 3.8% | 3,051,133 | 426,102 | 1,593,439 | 10.4% | 19.33 | 1,428,105 | 206,957 | 352,816 | 165,334 |
| 1992 | 3.5% | 3,157,806 | 436,026 | 1,894,039 | 11.7% | 14.00 | 1,673,105 | 245,000 | 300,600 | 220,934 |
| 1993 | 4.5% | 3,298,623 | 461,807 | 2,104,696 | 12.1% | 13.32 | 1,849,124 | 176,019 | 210,657 | 255,573 |
| 1994 | 4.9% | 3,459,491 | 484,329 | 2,202,303 | 7.1% | 12.91 | 2,045,761 | 196,637 | 97,606 | 156,542 |
| 1995 | 6.2% | 3,672,745 | 514,184 | 2,258,401 | 1.6% | 15.86 | 2,223,316 | 177,555 | 56,098 | 35,085 |
| 1996 | 5.8% | 3,886,443 | 544,102 | 2,435,440 | 1.4% | 19.68 | 2,402,373 | 179,057 | 177,039 | 33,067 |

Boxed area is forecast

By 1992, absorption and construction activities were declining. The fact that economic growth had been slowed and domestic financing became more difficult to obtain and to secure might have made developers and investors to be more careful with their investments [1]. The tight money policy and restriction on foreign ownership of real estate in Indonesia would continue to retard the construction activities. This was confirmed with the fact that foreign investment in Indonesia had fallen, because of the shift of these funds to other Asian countries especially the People's Republic of China [2].

As mentioned in previous chapters, multi-national joint venture companies and expatriates from foreign companies are the main targets of rental office business. The decline in new investment may be followed by the decline of demand by this segment of office occupiers. The forecast of moderate growth of GDP, even for the optimistic projection, would be followed by a period of lower level of absorption relative to the previous years. The situation is predicted to be even worse for the pessimistic GDP growth, in which the absorption is predicted to continue to fall.

The vacancy rate would rise slightly as the result of oversupply of office space from the record high completion in 1991 [3]. The sharp drop of completion level in 1994 to less than half of the level in 1993 would be the main reason the vacancy rate starts to decrease, and not because of the moderate growth of absorption forecasted by the model. This situation seems to be similar in both pessimistic and optimistic scenarios, although absorption is better in the optimistic situation.

The moderate peak of GDP forecasted in 1995 may become a signal to developers that have been waiting for a while, to start construction. If the activity continues, and the actual growth of GDP and employment remain very moderate, if not gradually declining, then vacancy rate will rise again. In the pessimistic situation, the vacancy rate may rise even sooner if the development activity continues because of the forecasted declining absorption level.

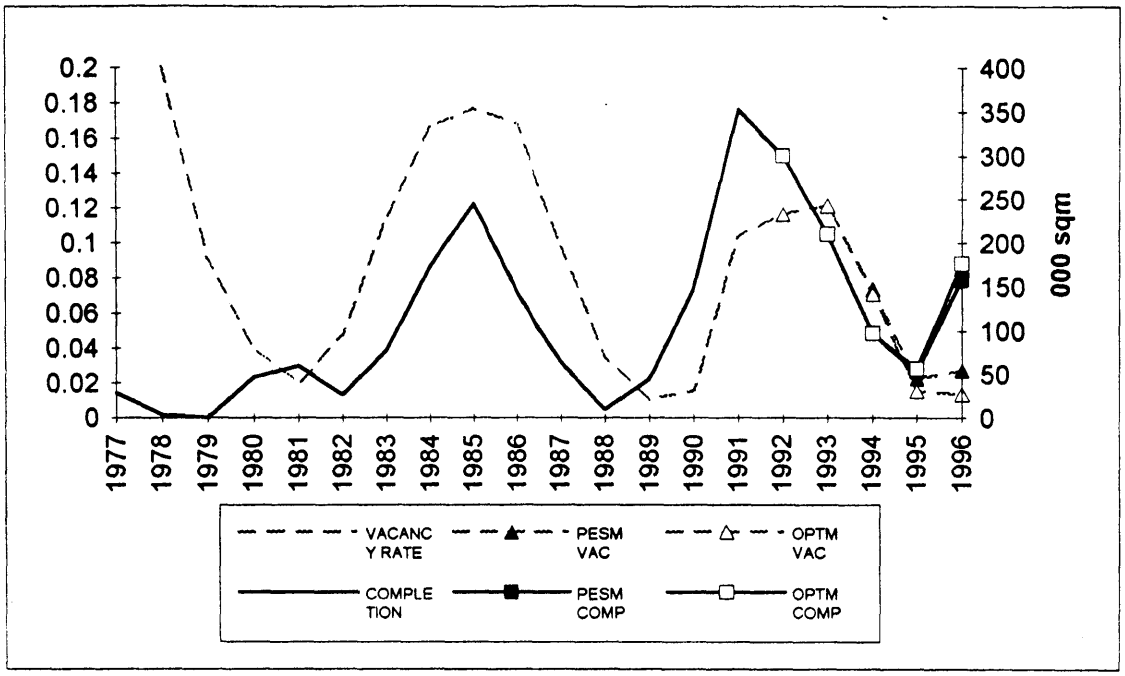


Figure 6.4 Pessimistic and Optimistic Forecasts of Vacancy Rate and Completion

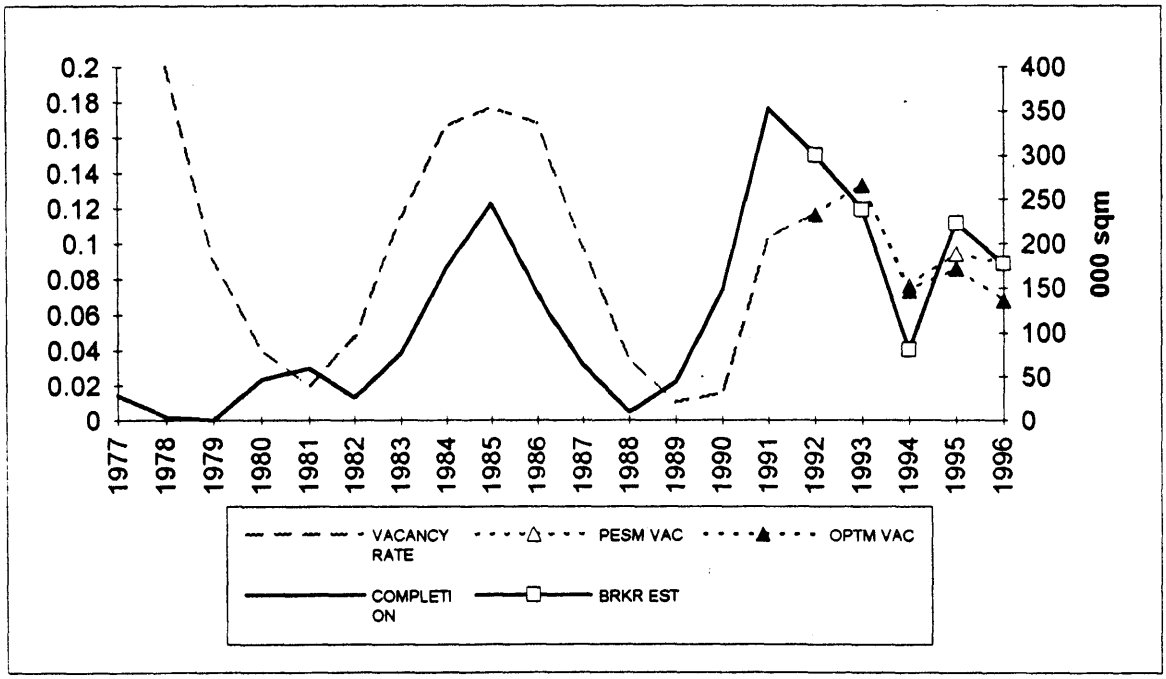


Figure 6.5 Pessimistic and Optimistic Forecasts of Vacancy Rate and Completion using Brokerage Estimates

Table 6.4 Pessimistic Forecast, Brokerage Firms' Estimates

**ABt = -585090 + 3.275 OEt-1 - 0.014 (Rt*OEt-1) - 0.35 OCt-1**

**Rt = 17.91 -59.78Vt-1 +0.17Rt-1**

**Ct = ESTIMATE FROM BROKERAGE FIRMS**

| YEAR | EMP GWTH | TOTAL EMP | OFF EMP | TOTAL STOCK sqm | VAC RATE | RENT 1992 $ | OCCPD SPACE sqm | ABS sqm | YEARLY SUPPLY sqm | VAC SPACE sqm |
|---|---|---|---|---|---|---|---|---|---|---|
| 1975 | | | | 103,525 | | | | | 40,000 | |
| 1976 | | 1,533,586 | 189,490 | 168,525 | | | | | 65,000 | |
| 1977 | 2.0% | 1,563,608 | 194,297 | 196,825 | | | | | 28,300 | |
| 1978 | 12.4% | 1,758,218 | 214,778 | 200,425 | 20.0% | 11.46 | 160,340 | | 3,600 | 40,085 |
| 1979 | 0.3% | 1,764,038 | 222,917 | 200,425 | 9.0% | 11.88 | 182,387 | 22,047 | 0 | 18,038 |
| 1980 | 9.5% | 1,931,114 | 244,030 | 247,425 | 4.1% | 11.74 | 237,404 | 55,018 | 47,000 | 10,021 |
| 1981 | 1.7% | 1,963,218 | 248,087 | 307,425 | 2.0% | 13.05 | 301,277 | 63,872 | 60,000 | 6,149 |
| 1982 | 2.4% | 2,010,321 | 249,046 | 333,805 | 4.7% | 16.59 | 318,006 | 16,730 | 26,380 | 15,799 |
| 1983 | 8.8% | 2,186,965 | 265,497 | 411,366 | 11.5% | 25.17 | 364,167 | 46,161 | 77,561 | 47,199 |
| 1984 | 3.3% | 2,259,508 | 282,391 | 584,720 | 16.6% | 13.25 | 487,503 | 123,336 | 173,354 | 97,217 |
| 1985 | 0.4% | 2,268,747 | 291,666 | 829,920 | 17.7% | 9.47 | 682,965 | 195,462 | 245,200 | 146,955 |
| 1986 | 1.5% | 2,302,527 | 312,123 | 974,056 | 16.8% | 9.13 | 810,183 | 127,218 | 144,136 | 163,873 |
| 1987 | 7.6% | 2,477,648 | 341,816 | 1,038,546 | 9.8% | 7.21 | 937,086 | 126,903 | 64,490 | 101,460 |
| 1988 | 2.4% | 2,536,056 | 351,256 | 1,048,096 | 3.5% | 14.00 | 1,011,087 | 74,001 | 9,550 | 37,009 |
| 1989 | 3.0% | 2,611,412 | 361,043 | 1,092,956 | 1.0% | 17.06 | 1,081,522 | 70,435 | 44,860 | 11,434 |
| 1990 | 12.5% | 2,938,549 | 407,113 | 1,240,623 | 1.6% | 25.75 | 1,221,148 | 139,626 | 147,667 | 19,475 |
| 1991 | 3.8% | 3,051,133 | 426,102 | 1,593,439 | 10.4% | 19.33 | 1,428,105 | 206,957 | 352,816 | 165,334 |
| 1992 | 3.5% | 3,157,806 | 436,026 | 1,894,039 | 11.7% | 14.00 | 1,673,105 | 245,000 | 300,600 | 220,934 |
| 1993 | 4.0% | 3,285,438 | 459,961 | 2,132,833 | 13.3% | 13.32 | 1,849,124 | 176,019 | 238,794 | 283,709 |
| 1994 | 4.0% | 3,418,229 | 478,552 | 2,214,147 | 7.7% | 12.22 | 2,044,511 | 195,387 | 81,314 | 169,636 |
| 1995 | 4.3% | 3,566,581 | 499,321 | 2,437,494 | 9.4% | 15.41 | 2,207,873 | 163,362 | 223,347 | 229,621 |
| 1996 | 4.3% | 3,721,372 | 520,992 | 2,615,385 | 9.0% | 14.90 | 2,381,162 | 173,289 | 177,891 | 234,223 |

Boxed area is forecast

Table 6.5 Optimistic Forecast, Brokerage Firms' Estimates

**ABt = -585090 + 3.275 OEt-1 - 0.014 (Rt*OEt-1) - 0.35 OCt-1**

**Rt = 17.91 -59.78Vt-1 +0.17Rt-1**

**Ct = ESTIMATE FROM BROKERAGE FIRMS**

| YEAR | EMP GWTH | TOTAL EMP | OFF EMP | TOTAL STOCK sqm | VAC RATE | RENT 1992 $ | OCCPD SPACE sqm | ABS sqm | YEARLY SUPPLY sqm | VAC SPACE sqm |
|---|---|---|---|---|---|---|---|---|---|---|
| 1975 | | | | 103,525 | | | | | 40,000 | |
| 1976 | | 1,533,586 | 189,490 | 168,525 | | | | | 65,000 | |
| 1977 | 2.0% | 1,563,608 | 194,297 | 196,825 | | | | | 28,300 | |
| 1978 | 12.4% | 1,758,218 | 214,778 | 200,425 | 20.0% | 11.46 | 160,340 | | 3,600 | 40,085 |
| 1979 | 0.3% | 1,764,038 | 222,917 | 200,425 | 9.0% | 11.88 | 182,387 | 22,047 | 0 | 18,038 |
| 1980 | 9.5% | 1,931,114 | 244,030 | 247,425 | 4.1% | 11.74 | 237,404 | 55,018 | 47,000 | 10,021 |
| 1981 | 1.7% | 1,963,218 | 248,087 | 307,425 | 2.0% | 13.05 | 301,277 | 63,872 | 60,000 | 6,149 |
| 1982 | 2.4% | 2,010,321 | 249,046 | 333,805 | 4.7% | 16.59 | 318,006 | 16,730 | 26,380 | 15,799 |
| 1983 | 8.8% | 2,186,965 | 265,497 | 411,366 | 11.5% | 25.17 | 364,167 | 46,161 | 77,561 | 47,199 |
| 1984 | 3.3% | 2,259,508 | 282,391 | 584,720 | 16.6% | 13.25 | 487,503 | 123,336 | 173,354 | 97,217 |
| 1985 | 0.4% | 2,268,747 | 291,666 | 829,920 | 17.7% | 9.47 | 682,965 | 195,462 | 245,200 | 146,955 |
| 1986 | 1.5% | 2,302,527 | 312,123 | 974,056 | 16.8% | 9.13 | 810,183 | 127,218 | 144,136 | 163,873 |
| 1987 | 7.6% | 2,477,648 | 341,816 | 1,038,546 | 9.8% | 7.21 | 937,086 | 126,903 | 64,490 | 101,460 |
| 1988 | 2.4% | 2,536,056 | 351,256 | 1,048,096 | 3.5% | 14.00 | 1,011,087 | 74,001 | 9,550 | 37,009 |
| 1989 | 3.0% | 2,611,412 | 361,043 | 1,092,956 | 1.0% | 17.06 | 1,081,522 | 70,435 | 44,860 | 11,434 |
| 1990 | 12.5% | 2,938,549 | 407,113 | 1,240,623 | 1.6% | 25.75 | 1,221,148 | 139,626 | 147,667 | 19,475 |
| 1991 | 3.8% | 3,051,133 | 426,102 | 1,593,439 | 10.4% | 19.33 | 1,428,105 | 206,957 | 352,816 | 165,334 |
| 1992 | 3.5% | 3,157,806 | 436,026 | 1,894,039 | 11.7% | 14.00 | 1,673,105 | 245,000 | 300,600 | 220,934 |
| 1993 | 4.5% | 3,298,623 | 461,807 | 2,132,833 | 13.3% | 13.32 | 1,849,124 | 176,019 | 238,794 | 283,709 |
| 1994 | 4.9% | 3,459,491 | 484,329 | 2,214,147 | 7.4% | 12.22 | 2,050,240 | 201,117 | 81,314 | 163,907 |
| 1995 | 6.2% | 3,672,745 | 514,184 | 2,437,494 | 8.6% | 15.56 | 2,228,221 | 177,980 | 223,347 | 209,273 |
| 1996 | 5.8% | 3,886,443 | 544,102 | 2,615,385 | 6.9% | 15.42 | 2,436,182 | 207,962 | 177,891 | 179,203 |

Boxed area is forecast

When the forecasts from the models are compared with brokerage firms' estimates on completion, there are some discrepancies found. The first two years seem fairly similar between brokers' estimate and both scenarios. The main difference is in the brokers' prediction of significant increases in development activities starting in 1994. What might happen is the difference of the prediction of reaction to the forecasted improvement in economic growth between 1993 and 1995. For some developers, the record high supply of office space coupled with the slower growth in 1992 may force them to delay their projects. The delays may involve some contracts as well. The prediction of economic improvement may encourage them to take the chance to continue their original plans and to reduce losses due opportunity costs as well as real costs for not continuing the projects.

Interestingly enough, at the end of the forecast period, both brokers' estimates and model forecasts on completion yield at the same level in 1995 except that they moved in the opposite direction to that point. The brokers' estimate predicted a downturn of the cycle. Here, the level of completion declines and the vacancy rates in both scenarios follow accordingly. The vacancy rates will determine future rents, which in turn, along with the change in employment, determines the absorption, and the whole cycle of the model starts over again. Given the same forecast of employment growth, the differences in the forecasts of completion levels will consequently result in different vacancy rates, rents, and absorption levels.

The model for completion has two year lag for its variables. The forecasts from this model for the 1993 and 1994 are very close to those estimated by brokerage firms. This indicates that the model works. However, the market, especially in developing countries like Indonesia, often involves uncertainties and exogenous factors that cannot be measured through the market determinants and therefore cause different prediction of market behavior. If the confirmed supply of new office space is as reported then it may be better to use them in the model. However, the estimates obtained from the two brokers, which are only 1 month apart, are quite different. Some differences are quite significant

because each analyst may interpret the situation differently and incorporate different exogenous factors in the prediction. In any case, these brokers' estimates has incorporated some exogenous factors that cannot be predicted by the forecast model or beyond the scope of this analysis. Provided that none of this occurs, and provided that the correlation between GDP growth and employment holds, then the forecast model use in this analyses should become a good predicting tool.

## Financing and Investment Outlook of Jakarta Office Market

The rest of the sections in this chapter will discuss the other factors that affect the market behavior and the way developers or investors, as well as tenants affected by these factors. In addition, the sections will also discuss current approaches in the development process and the prospect of these approaches.

This thesis focuses on the analysis of office market as a property market. The analysis has used supply (office space) as final products, or supply considered at the end of the process of production of office real estate as a durable capital good.

As a product, there are factors that affect the production process. These are constraints in the capital market and constraints due to government regulations. In capital market constraints can be the rates for construction loan which will directly affect the production of new office buildings. Another lending rate that would affect the production process is the credit rates required by firms for business investments or expansions. This would affect the demand to occupy office space and willingness to pay, thus directly affect rent (property managers) while indirectly affect the supply of new office (developers).

Banks, both domestic or foreign, are the sources of financing especially for construction. Currently, many foreign banks may shift their funds to investments away from Indonesia. The strategy of seeking credits from domestic banks in this situation, does not really help toward the solutions. Part of this is the pressure from the government

to allocate 80% of the banks' loan portfolio to export oriented businesses [4]. Thus real estate falls into the 20% category. Lending rates was as high as 25 % charged by some lenders [5].

Current conditions of the market does not seem to promise good prospects for investment in real estate in the immediate future, especially in the office market. Analysts agree on the slowing down of the economy and has projected a very moderate future growth, even in the optimistic scenario as discussed previously in this chapter. The constraints in the capital market and the government regulations can put smaller developers in jeopardy.

## Joint Ventures

Financing for future investment becomes one major hurdle for investments in real estate in Jakarta. The strategy of raising capital through the formation of joint ventures have been implemented as the alternative to loans from banks especially for construction or short term financing. While for long term financing, developers, especially in residential start to seek loans from institutional lenders such as pension funds.

Joint ventures as vehicle for foreign investment are also highly regulated by the government. In general, only in exceptional circumstances a foreign company can become a wholly equity owned company. Joint ventures shall be formed with local partners. The government set regulations for joint ventures about the maximum interest of a foreign partner in a joint venture (80%), which must divest its shares to a maximum 49% within 20 year period [6]. Despite these regulations, both domestic and multi-national joint ventures still become the form of business entity most accepted and most applied by developers especially as a vehicle to raise capital.

## The 'Superblock'

A series of multi billion US dollar projects, nicknamed 'superblock', have been partially launched recently. This is an extreme case in term of the size of development. This project is so huge that the whole complex looks like a small town. One of the superblock project is being carried out in the SDM area (see chapter 6). The project involves multi joint venture agreements for the individual buildings within the block [7]

The Superblock development is clearly the case of financially strong companies with strong reputation and connection to the capital market, and often, to some political power. This development seems to reject the theory about oversupply and capital scarcity that has been discussed. The among of the capital required to clear such a huge piece of land must be a tremendously large. This is one part of the project that must be secured very early in the process. The environmental impact would be too large not to involve some political decisions. Since this is an extreme case, this approach may not reflect the genereal direction the future of real estate development.

## Strata Titles

The new approach in office development is the implementation of Strata Title. This is approach is not entirely new. The basic regulation of Strata Title originally designed for public housing projects [8]. It is also similar to, or better known as, the concept of condominium in which each occupier can own a unit, instead of renting it, and a share of the common space.

Despite the complicated legal aspects of the applications of this approach to non-residential projects, Strata Title has gained popularity in countries such as Singapore and Hong Kong [9]. From the financing stand point, this approach can also provide some solution to the scarcity of funds. The prospective owners may pay up front for their units.

If the demand of the units is high, then the up front payment collectively can become one source of financing in the development process.

A new office building recently completed Indonesia became the first office or any non-residential building developed with the Strata Title approach. The prospective owners of the unit is required to pay 50% down payment and can finance the other half [10].

## Multi-use Development and Product Diversifications

The superblock is an extreme case of multi-use development. This block becomes almost like a mini central business district within a larger one. The tasks involved in each stage of the development process would be monumental and probably involving an army of interested parties. A smaller version of this development is the mix or multi use commercial buildings. The combinations are usually office and retails, but sometimes also include hotels and apartments. If the project includes retails, then the location and the target market of the project becomes very critical and the economic analysis become far more complex.

The idea behind multi use development is product diversifications. Currently, some analysts stated that apartments and to some extent, hotels, are quite stable or even promising good returns, while offices are the worst hit by the economy these days [11]. Then, by developing and operating, or in general investing, in a basket of different type of real estate product, the potential financial risks of developing only one type of product can be diversified away. This development is not necessarily a multi-use development approach. In a way, the characteristics of the location of a property can contribute to the property's successfulness to diversify away financial risks. Thus, the multi-use approach actually cannot take advantage of the potential benefits of diversified locations.

Diversification may also be done geographically not only at a city scale, but also at intercity or international scales. At this point, in Indonesia, intercity diversification can only involve very few options of geographical locations that have more established real estate markets. The geographical diversification that may be most feasible to apply in Indonesia is the residential properties.

Geographical diversification may also be done internationally especially within the neighboring ASEAN countries in which many barriers in economic relationship has been lifted. Investors from Singapore had done this in Malaysia and also Indonesia.

As concluding remarks of the last few sections, it can be summarized that the scarcity of the sources of financing would become the main problem in real estate development in Indonesia. The Strata Title approach seems to be promising and with some adjustment in its legal aspect may become the future trend in non-residential development if the first project just launched proven to be successful.

The notion of risks diversification in real estate market had been done in the US. In a currently relatively small market in Indonesia, this strategy may or may not work. The concept of offsetting the loss of one property with the gain of the other is conceptually good, but this may require quite a number of well located properties to hold not only a collection of a few ones, in order to make this diversification works properly.

**References**


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[3] Procon Indah / Jones Lang Wooton ,"Property Market Outlook", *Procon Indah /JLW Research,* Jakarta, Indonesia (January 1993), p. 1

[4] See [1], p. 43

[5] See [3], p. 1

[6] Procon Indah/Jones Lang Wootton, "A Guide for Foreign Investors in Indonesian Real Estate," *Procon Indah/JLW Research,* Jakarta Indonesia, (May 1993), p. 13.

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# CHAPTER 7
# CONCLUSIONS

This chapter will discuss what had been learned about the characteristics of the Jakarta office market. The findings and conclusions from the analyses in the previous chapters will be summarized in the following.

Absorption level, as expected, is positively correlated to office employment and the consumption of space per worker. The amount of space per worker varies with rents, and from the analysis of the model, it was demonstrated that an increase of $1 in rent would reduce the amount of space per worker 0.04 square meters. In turn, this would also reduce the amount of space this firm want to occupy. From the landlords point of view the space per worker is not price (or rent) elastic.

The model also showed that 35% of tenants or about all tenants that have legal rights to move or to renew leases would like to renegotiate the agreement in order to achieve their target space per worker. However, they are only willing to pay a small increment for this additional space.

Rents vary with vacancy rates and in the Jakarta office market, 83% of all rents would immediately adjust to the change of vacancy rates. This rate shows that rents are quite volatile. As rents vary with vacancy rates, then the reservation rent of landlords, or the minimum rent landlords would accept, moves with vacancy in a negative correlation. When the vacancy rate goes up 1%, the target rent would be reduced by $0.72. Landlords tend to maximize this level that reflect the level of rents they are willing to accept, while prospective tenants would like to go the other way.

These prospective tenants would like to negotiate their demand on certain issues of the rents that reflect rent provisions, building features and amenities, or services and their willingness to pay. The hedonic model discussed in chapter 5 can provide suggestions for

landlords in setting leasing strategy or tenants in finding out the right place for the right price. Tenants may want to rent a space in a property in the highly prestigious SDM area, but consequently have to pay the high price. At this time, renting an office space in GSB area can be considered as a bargain for one of the golden triangle area. The estimated range of rent between $ 22.30 to $24 is still lower than the lowest estimated rent in SDM area of $25.90. Although one of the estimate of HRS is lower than GSB, but with better parking facilities tenants may optimize the tradeoffs.

The macroeconomic analyses indicated a mediocre performance for investments in office market, but development activities did not seem to recognize this. The relatively short cycle of completion, shown by the two year lag in the model, encouraged 76% of active developers to pursue their long run target of completion level. This shows a highly speculative and risky development activities, which would lead toward a volatile real estate market.

The economic growth has been forecasted as moderate and relatively stable, ranging between 5.2% to 8.8% throughout the forecast periods in both the optimistic and pessimistic scenarios. This would slow down the development activities. Most of new supply of offices would come from ongoing projects or plans started in the previous periods. The difficulties to obtain domestic loans contributed to the decline in investments and development in real estate. This situation, coupled with the scarcity of foreign investment, which has been shifted to other Asian countries, would further force the market to slow down and consolidate.

As development activities decreases, so does the vacancy rate, which in turn affect rents and absorption level. Between 1992 and 1995, the model shows that the vacancy rates and completion levels forecasts look very similar in both pessimistic and optimistic scenarios. Completion levels would fall about 250,000 sqm, while vacancy rates drop about 9 to 10% during this period. Beyond this, the forecasts in the two scenarios still look similar for completion levels, but distinguishable for vacancy rates. Development

activities would increase again and the completion levels rises about 100,000 sqm within the next period. The pessimistic forecast shows a slight increase in the vacancy rates, while in the optimistic forecast the vacancy rates look more stabilized. Rents, however, are forecasted to rise very similarly to just under $20.00 per sqm in 1996 in the two scenarios.

The GDP is forecasted to reach its peak in 1995. This takes a little longer than the 2 year cycle suggested in the completion model. But the timing could not have been better for those not having problems in raising capital and willing to take risks. The best suggestion in this situation is to start the early process development especially those dealing with selecting, acquiring, assembling, and clearing the site.

Although the properties in the golden triangle area seem to promise high rental income, but the high initial investment, especially for the high price of land, may hurt the potential returns on investment of the developers. Besides, there is a good possibility that the lands in the area have been acquired by developers waiting for a better timing to start development. The chance to invest in office properties in this area may be through the purchase of a well developed property and to operate it. For investment in development, developers may have to turn their target of location to the area outside the golden triangle.

The hedonic model shows that SPR location promises high rental income and good returns on investment, provided that the land price is still much lower than those in the golden triangle area. This location is very close to the triangle, right by the expressway, and linked to another center of business district (the old CBD). Most of office buildings in this area are under 10 story high. But this should not become a major concern, since taller buildings require higher basic operating expenses, and more important, the prospective tenants are not willing to pay too much extra for a space in a taller building. Parking spaces and other amenities can also be planned to respond to the current and future demand trends.

In dealing with financing issues, the Strata Titles approach seems to be promising. However, the fact that the legal aspect of this approach has not been amended for non-residential application implies potential future problems that must be taken into consideration.

Diversification, either product or geographic, is arguably a good way to overcome the volatility of the market. However, in a relatively small and less 'mature' market such as that of Jakarta, investors or developers may end up implementing the so called 'naive' diversifications. International diversifications sound promising too, but it may require further study and evidence on the best way to execute this strategy.

From this study, it shows that the prospects to invest in office properties, or real estate in general, in Jakarta from the macroeconomic perspective seems not too bad at all with a good timing. This is contingent to several conditions such as the process of site selection and assemblage, permit, and financing.

# APPENDIX A
# 82 OBSERVATION DATA SET FOR HEDONIC MODEL

| | LOCATION | LOC CODE | YEAR COMP | HEIGHT (FLR) | TOT AREA SQM | TYP FL | AVG REAL R |
|---|---|---|---|---|---|---|---|
| 1 | HRS | 3 | 1993 | 24 | 20,500 | 854 | 22.00 |
| 2 | SPR | 5 | 1978 | 8 | 3,524 | 441 | 22.39 |
| 3 | SDM | 1 | 1976 | 19 | 18,500 | 974 | 21.20 |
| 4 | MHT | 2 | 1992 | 24 | 31,200 | 1,300 | 24.00 |
| 5 | MHT | 2 | 1981 | 32 | 41,675 | 1,302 | 24.66 |
| 6 | HRS | 3 | 1985 | 10 | 8,251 | 825 | 16.70 |
| 7 | HRS | 3 | 1990 | 6 | 10,000 | 1,667 | 16.96 |
| 8 | MHT | 2 | 1992 | 30 | 55,375 | 1,846 | 21.62 |
| 9 | SDM | 1 | 1990 | 17 | 24,800 | 1,459 | 25.18 |
| 10 | SDM | 1 | 1989 | 33 | 73,000 | 2,212 | 25.93 |
| 11 | GSB | 4 | 1982 | 10 | 10,380 | 1,038 | 17.15 |
| 12 | SDM | 1 | 1983 | 21 | 21,600 | 1,029 | 22.97 |
| 13 | GSB | 4 | 1991 | 11 | 20,075 | 1,825 | 22.50 |
| 14 | SDM | 1 | 1986 | 23 | 43,000 | 1,870 | 25.27 |
| 15 | HRS | 3 | 1983 | 6 | 6,000 | 1,000 | 27.99 |
| 16 | HRS | 3 | 1990 | 8 | 11,000 | 1,375 | 22.80 |
| 17 | HRS | 3 | 1991 | 11 | 10,882 | 989 | 26.00 |
| 18 | MMS | 7 | 1982 | 12 | 16,000 | 1,333 | 20.42 |
| 19 | MHT | 2 | 1991 | 8 | 5,900 | 738 | 26.00 |
| 20 | SPR | 5 | 1991 | 11 | 10,890 | 990 | 22.00 |
| 21 | SDM | 1 | 1991 | 27 | 93,500 | 3,463 | 22.00 |
| 22 | GHK | 6 | 1991 | 24 | 37,000 | 1,542 | 23.00 |
| 23 | MHT | 2 | 1974 | 12 | 19,787 | 1,649 | 21.42 |
| 24 | GHK | 6 | 1984 | 26 | 24,000 | 923 | 19.58 |
| 25 | SDM | 1 | 1973 | 17 | 13,000 | 765 | 17.16 |
| 26 | GHK | 6 | 1985 | 22 | 28,000 | 1,273 | 18.50 |
| 27 | HRS | 3 | 1992 | 11 | 16,400 | 1,491 | 20.75 |
| 28 | HRS | 3 | 1993 | 28 | 43,176 | 1,542 | 23.41 |
| 29 | SDM | 1 | 1986 | 32 | 56,000 | 1,750 | 24.62 |
| 30 | SDM | 1 | 1991 | 32 | 56,000 | 1,750 | 27.54 |
| 31 | GSB | 4 | 1984 | 12 | 19,000 | 1,583 | 21.46 |
| 32 | HRS | 3 | 1987 | 13 | 19,465 | 1,497 | 21.83 |
| 33 | SDM | 1 | 1991 | 21 | 13,088 | 623 | 24.50 |
| 34 | GSB | 4 | 1985 | 9 | 23,000 | 2,556 | 23.00 |
| 35 | HRS | 3 | 1992 | 13 | 12,000 | 923 | 24.00 |
| 36 | SDM | 1 | 1985 | 19 | 22,000 | 1,158 | 26.93 |
| 37 | MHT | 2 | 1984 | 32 | 31,000 | 969 | 25.31 |
| 38 | HRS | 3 | 1993 | 7 | 12,000 | 1,714 | 23.87 |
| 39 | OTH | 8 | 1990 | 5 | 8,500 | 1,700 | 19.81 |
| 40 | GSB | 4 | 1992 | 13 | 15,000 | 1,154 | 20.50 |
| 41 | GSB | 4 | 1991 | 14 | 50,000 | 3,571 | 22.00 |
| 42 | SDM | 1 | 1992 | 17 | 20,500 | 1,206 | 30.00 |
| 43 | SDM | 1 | 1981 | 8 | 16,000 | 2,000 | 21.90 |
| 44 | SDM | 1 | 1980 | 14 | 16,000 | 1,143 | 20.57 |
| 45 | HRS | 3 | 1988 | 8 | 12,000 | 1,500 | 20.81 |
| 46 | GSB | 4 | 1983 | 23 | 38,000 | 1,652 | 20.00 |
| 47 | MHT | 2 | 1992 | 14 | 35,286 | 2,520 | 23.50 |
| 48 | HRS | 3 | 1992 | 11 | 10,882 | 989 | 21.00 |
| 49 | SDM | 1 | 1985 | 15 | 12,000 | 800 | 17.84 |

# APPENDIX A
# 82 OBSERVATION DATA SET FOR HEDONIC MODEL

| | LOCATION | LOC CODE | YEAR COMP | HEIGHT (FLR) | TOT AREA SQM | TYP FL | AVG REAL R |
|---|---|---|---|---|---|---|---|
| 50 | SDM | 1 | 1980 | 32 | 31,000 | 969 | 23.82 |
| 51 | SDM | 1 | 1977 | 14 | 15,300 | 1,093 | 26.79 |
| 52 | SPR | 5 | 1991 | 8 | 10,500 | 1,313 | 25.58 |
| 53 | HRS | 3 | 1990 | 13 | 30,987 | 2,384 | 25.83 |
| 54 | MHT | 2 | 1976 | 12 | 12,000 | 1,000 | 23.12 |
| 55 | SPR | 5 | 1991 | 15 | 21,935 | 1,462 | 24.65 |
| 56 | SDM | 1 | 1987 | 21 | 21,000 | 1,000 | 27.42 |
| 57 | HRS | 3 | 1986 | 5 | 12,000 | 2,400 | 24.07 |
| 58 | HRS | 3 | 1987 | 5 | 15,000 | 3,000 | 23.07 |
| 59 | HRS | 3 | 1985 | 8 | 24,000 | 3,000 | 22.00 |
| 60 | SDM | 1 | 1991 | 20 | 17,150 | 858 | 26.50 |
| 61 | HRS | 3 | 1984 | 11 | 10,000 | 909 | 22.12 |
| 62 | HRS | 3 | 1990 | 8 | 12,412 | 1,552 | 25.28 |
| 63 | OTH | 8 | 1990 | 8 | 11,174 | 1,397 | 17.96 |
| 64 | SPR | 5 | 1990 | 16 | 11,294 | 706 | 26.00 |
| 65 | MMS | 7 | 1975 | 14 | 27,500 | 1,964 | 20.01 |
| 66 | GSB | 4 | 1984 | 20 | 12,500 | 625 | 20.95 |
| 67 | HRS | 3 | 1983 | 9 | 13,960 | 1,551 | 24.48 |
| 68 | SPR | 5 | 1990 | 12 | 22,000 | 1,833 | 23.40 |
| 69 | SDM | 1 | 1992 | 21 | 23,500 | 1,119 | 27.17 |
| 70 | SDM | 1 | 1991 | 20 | 24,750 | 1,238 | 23.50 |
| 71 | MHT | 2 | 1990 | 16 | 20,000 | 1,250 | 24.50 |
| 72 | SDM | 1 | 1984 | 17 | 12,039 | 708 | 23.00 |
| 73 | HRS | 3 | 1990 | 9 | 10,500 | 1,167 | 22.25 |
| 74 | SDM | 1 | 1986 | 24 | 25,000 | 1,042 | 21.87 |
| 75 | GHK | 6 | 1984 | 15 | 38,000 | 2,533 | 23.91 |
| 76 | SDM | 1 | 1984 | 24 | 18,384 | 766 | 26.72 |
| 77 | MHT | 2 | 1977 | 20 | 13,000 | 650 | 20.72 |
| 78 | SDM | 1 | 1976 | 16 | 16,000 | 1,000 | 24.53 |
| 79 | SDM | 1 | 1985 | 16 | 16,000 | 1,000 | 26.45 |
| 80 | MHT | 2 | 1972 | 28 | 31,000 | 1,107 | 22.32 |
| 81 | SDM | 1 | 1985 | 17 | 12,000 | 706 | 22.72 |
| 82 | SDM | 1 | 1991 | 20 | 64,000 | 3,200 | 25.25 |

Source Compiled from Indonesian Business Data Centre, Colliers Jardine, Procon Indah/JLW, Swa Magazine May 1990, Independent Survey

# APPENDIX B
# 54 OBSERVATION DATA SET FOR HEDONIC MODEL

| | LOC | LOC CODE | YEAR COMP | HEIGHT (FLR) | TERM | SQM | RENT PMT | FIT OUT | TOTAL PARKG | TEL DEP | REAL RENT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SDM | 1 | 1976 | 19 | 2 | 18,500 | 4 | 0 | 450 | 1,972 | 22.00 |
| 2 | MHT | 2 | 1992 | 24 | 3 | 31,200 | 2 | 1 | 312 | 2,200 | 24.00 |
| 3 | MHT | 2 | 1981 | 32 | 1 | 41,675 | 4 | 0 | 560 | 1,479 | 23.00 |
| 4 | HRS | 3 | 1985 | 10 | 3 | 8,251 | 4 | 0 | 184 | 1,500 | 14.00 |
| 5 | HRS | 3 | 1990 | 6 | 3 | 10,000 | 4 | 0 | 174 | 1,500 | 16.00 |
| 6 | SDM | 1 | 1990 | 17 | 3 | 24,800 | 2 | 0 | 200 | 1,233 | 23.50 |
| 7 | SDM | 1 | 1989 | 33 | 3 | 73,000 | 4 | 0 | 2,100 | 2,000 | 25.00 |
| 8 | SDM | 1 | 1983 | 21 | 2 | 21,600 | 1 | 0 | 612 | 1,972 | 23.00 |
| 9 | GSB | 4 | 1991 | 11 | 2 | 20,075 | 2 | 1 | 368 | 1,849 | 22.50 |
| 10 | SDM | 1 | 1986 | 23 | 3 | 43,000 | 4 | 0 | 650 | 1,356 | 23.00 |
| 11 | HRS | 3 | 1991 | 11 | 3 | 10,882 | 4 | 0 | 172 | 1,630 | 26.00 |
| 12 | MHT | 2 | 1974 | 12 | 1 | 19,787 | 4 | 0 | 300 | 2,712 | 23.50 |
| 13 | GHK | 6 | 1984 | 26 | 3 | 24,000 | 2 | 0 | 1,200 | 1,479 | 19.00 |
| 14 | SDM | 1 | 1973 | 17 | 1 | 13,000 | 1 | 0 | 200 | 986 | 14.50 |
| 15 | GHK | 6 | 1985 | 22 | 3 | 28,000 | 1 | 0 | 1,500 | 986 | 18.50 |
| 16 | SDM | 1 | 1986 | 32 | 3 | 56,000 | 4 | 0 | 1,100 | 2,000 | 21.50 |
| 17 | SDM | 1 | 1991 | 32 | 3 | 56,000 | 4 | 0 | 1,100 | 2,000 | 21.50 |
| 18 | SDM | 1 | 1991 | 21 | 3 | 13,088 | 4 | 0 | 300 | 2,000 | 24.50 |
| 19 | GSB | 4 | 1985 | 9 | 3 | 23,000 | 12 | 0 | 1,200 | 1,479 | 23.00 |
| 20 | HRS | 3 | 1992 | 13 | 3 | 12,000 | 4 | 0 | 120 | 1,248 | 24.00 |
| 21 | SDM | 1 | 1985 | 19 | 3 | 22,000 | 2 | 0 | 400 | 740 | 28.00 |
| 22 | MHT | 2 | 1984 | 32 | 3 | 31,000 | 6 | 0 | 457 | 1,000 | 24.00 |
| 23 | HRS | 3 | 1993 | 7 | 1 | 12,000 | 4 | 0 | 235 | 1,500 | 20.00 |
| 24 | GSB | 4 | 1992 | 13 | 3 | 15,000 | 2 | 1 | 247 | 1,143 | 20.50 |
| 25 | SDM | 1 | 1981 | 8 | 3 | 16,000 | 2 | 0 | 250 | 1,036 | 22.50 |
| 26 | SDM | 1 | 1980 | 14 | 3 | 16,000 | 2 | 0 | 250 | 1,036 | 18.50 |
| 27 | HRS | 3 | 1988 | 8 | 2 | 12,000 | 4 | 0 | 100 | 1,248 | 17.00 |
| 28 | GSB | 4 | 1983 | 23 | 1 | 38,000 | 1 | 0 | 300 | 493 | 20.00 |
| 29 | HRS | 3 | 1992 | 11 | 3 | 10,882 | 4 | 0 | 500 | 1,248 | 21.00 |
| 30 | SDM | 1 | 1985 | 15 | 3 | 12,000 | 4 | 0 | 250 | 2,000 | 20.00 |
| 31 | SDM | 1 | 1980 | 32 | 3 | 31,000 | 1 | 0 | 300 | 2,000 | 22.00 |
| 32 | SDM | 1 | 1977 | 14 | 3 | 15,300 | 1 | 0 | 340 | 1,233 | 22.25 |
| 33 | SPR | 5 | 1991 | 8 | 3 | 10,500 | 4 | 0 | 150 | 900 | 21.50 |
| 34 | SDM | 1 | 1987 | 21 | 3 | 21,000 | 1 | 0 | 650 | 1,500 | 28.00 |
| 35 | HRS | 3 | 1986 | 5 | 2 | 12,000 | 4 | 0 | 325 | 750 | 23.00 |
| 36 | HRS | 3 | 1987 | 5 | 2 | 15,000 | 4 | 0 | 325 | 750 | 20.00 |
| 37 | HRS | 3 | 1985 | 8 | 3 | 24,000 | 2 | 1 | 1,250 | 1,248 | 22.00 |
| 38 | SDM | 1 | 1991 | 20 | 3 | 17,150 | 2 | 1 | 321 | 2,096 | 26.50 |
| 39 | HRS | 3 | 1984 | 11 | 3 | 10,000 | 4 | 0 | 225 | 986 | 23.80 |
| 40 | HRS | 3 | 1990 | 8 | 2 | 12,412 | 4 | 0 | 222 | 1,750 | 26.50 |
| 41 | GSB | 4 | 1984 | 20 | 2 | 12,500 | 4 | 0 | 250 | 1,233 | 19.00 |
| 42 | SDM | 1 | 1991 | 20 | 3 | 24,750 | 12 | 3 | 740 | 1,750 | 23.50 |
| 43 | MHT | 2 | 1990 | 16 | 3 | 20,000 | 12 | 0 | 200 | 2,000 | 24.50 |
| 44 | SDM | 1 | 1984 | 17 | 2 | 12,039 | 4 | 1 | 245 | 1,726 | 23.00 |
| 45 | HRS | 3 | 1990 | 9 | 3 | 10,500 | 4 | 0 | 250 | 1,248 | 21.00 |
| 46 | SDM | 1 | 1986 | 24 | 3 | 25,000 | 4 | 0 | 350 | 1,109 | 22.95 |
| 47 | GHK | 6 | 1984 | 15 | 1 | 38,000 | 4 | 0 | 1,200 | 740 | 22.00 |
| 48 | SDM | 1 | 1984 | 24 | 3 | 18,384 | 1 | 0 | 1,222 | 986 | 28.00 |
| 49 | MHT | 2 | 1977 | 20 | 3 | 13,000 | 4 | 0 | 200 | 2,000 | 18.00 |
| 50 | SDM | 1 | 1976 | 16 | 3 | 16,000 | 1 | 0 | 250 | 1,479 | 25.25 |
| 51 | SDM | 1 | 1985 | 16 | 3 | 16,000 | 1 | 0 | 250 | 1,479 | 25.25 |
| 52 | MHT | 2 | 1972 | 28 | 2 | 31,000 | 1 | 0 | 400 | 986 | 21.30 |
| 53 | SDM | 1 | 1985 | 17 | 3 | 12,000 | 4 | 0 | 200 | 1,726 | 22.00 |
| 54 | SDM | 1 | 1991 | 20 | 3 | 64,000 | 2 | 0 | 1,700 | 1,726 | 25.25 |

Sources Compiled from Indonesian Business Data Center, Colliers Jardine, Procon Indah/JLW, Swa Magazine May 1990, Independent Survey

# APPENDIX C
# 30 OBSERVATION DATA SET FOR HEDONIC MODEL

| | LOC | LOC CODE | YEAR COMP | TYP FLR | TERM | RENT PMT | FIT OUT | NO. PARK | PARK CHRG | TEL DEP | TLX DEP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | GHK | 6 | 1985 | 1,273 | 3 | 1 | 0 | 1,500 | 1 | 986 | 493 |
| 2 | GHK | 6 | 1984 | 2,533 | 1 | 4 | 0 | 380 | 2 | 740 | 986 |
| 3 | GSB | 4 | 1991 | 1,825 | 2 | 2 | 1 | 368 | 2 | 1,849 | 2,465 |
| 4 | HRS | 3 | 1985 | 825 | 3 | 4 | 0 | 184 | 2 | 1,500 | 2,500 |
| 5 | HRS | 3 | 1990 | 1,667 | 3 | 4 | 0 | 174 | 0 | 1,500 | 2,500 |
| 6 | HRS | 3 | 1990 | 1,552 | 2 | 4 | 0 | 222 | 2 | 1,750 | 1,750 |
| 7 | MHT | 2 | 1992 | 1,300 | 3 | 2 | 1 | 312 | 3 | 2,200 | 4,000 |
| 8 | MHT | 2 | 1981 | 1,302 | 1 | 4 | 0 | 560 | 3 | 1,479 | 2,219 |
| 9 | MHT | 2 | 1974 | 1,649 | 1 | 4 | 0 | 300 | 0 | 2,712 | 0 |
| 10 | MHT | 2 | 1984 | 969 | 3 | 2 | 0 | 457 | 2 | 1,000 | 1,000 |
| 11 | MHT | 2 | 1977 | 650 | 3 | 4 | 0 | 200 | 3 | 2,000 | 1,000 |
| 12 | SDM | 1 | 1976 | 974 | 2 | 4 | 0 | 450 | 0 | 1,972 | 0 |
| 13 | SDM | 1 | 1990 | 1,459 | 3 | 2 | 0 | 200 | 0 | 1,233 | 1,972 |
| 14 | SDM | 1 | 1983 | 1,029 | 2 | 1 | 0 | 612 | 3 | 1,972 | 1,972 |
| 15 | SDM | 1 | 1986 | 1,870 | 3 | 4 | 0 | 650 | 2 | 1,356 | 1,972 |
| 16 | SDM | 1 | 1973 | 765 | 1 | 1 | 0 | 200 | 0 | 986 | 0 |
| 17 | SDM | 1 | 1986 | 1,750 | 3 | 4 | 0 | 1,100 | 2 | 2,000 | 3,000 |
| 18 | SDM | 1 | 1991 | 1,750 | 3 | 4 | 0 | 1,100 | 2 | 2,000 | 3,000 |
| 19 | SDM | 1 | 1985 | 1,158 | 3 | 2 | 0 | 400 | 3 | 740 | 1,479 |
| 20 | SDM | 1 | 1980 | 969 | 3 | 1 | 0 | 300 | 2 | 2,000 | 3,000 |
| 21 | SDM | 1 | 1977 | 1,093 | 3 | 1 | 0 | 340 | 2 | 1,233 | 1,603 |
| 22 | SDM | 1 | 1987 | 1,000 | 3 | 1 | 0 | 650 | 3 | 1,500 | 5,000 |
| 23 | SDM | 1 | 1991 | 858 | 3 | 2 | 1 | 321 | 3 | 2,096 | 2,835 |
| 24 | SDM | 1 | 1991 | 1,238 | 3 | 12 | 1 | 740 | 2 | 1,750 | 3,000 |
| 25 | SDM | 1 | 1984 | 708 | 2 | 4 | 1 | 245 | 3 | 1,726 | 2,712 |
| 26 | SDM | 1 | 1986 | 1,042 | 3 | 4 | 0 | 350 | 2 | 1,109 | 1,479 |
| 27 | SDM | 1 | 1976 | 1,000 | 3 | 1 | 0 | 250 | 2 | 1,479 | 1,479 |
| 28 | SDM | 1 | 1985 | 1,000 | 3 | 1 | 0 | 250 | 2 | 1,479 | 1,479 |
| 29 | SDM | 1 | 1985 | 706 | 3 | 4 | 0 | 200 | 2 | 1,726 | 2,219 |
| 30 | SDM | 1 | 1991 | 3,200 | 3 | 2 | 0 | 1,700 | 3 | 1,726 | 2,219 |

Source Compiled from Indonesian Business Data Centre, Colliers Jardine, Procon Indah/JLW, Swa Magazine May 1990, Independent Survey

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